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GROWTH AND CYCLICAL FLUCTUATIONS IN SPANISH MACROECONOMIC SERIES *

Francisco Xavier Lores †

Abstract

This paper provides an empirical description of some stylized facts of growth for the Spanish economy with the purpose of evaluating the adequacy of the neoclassical model of growth as a structure on which we can build a theory of the economic cycle for the Spanish economy. On the other hand, the description of the fluctuations in the Spanish economy is expanded and analyzed by taking into account different theories developed in literature. In this work, we use three filters to remove trends from the data: first differences, Hodrick-Prescott filter and Baxter-King filter. The task here is to check whether the stylized facts keep, at least, qualitatively equal with different filters, so that invariant stylized facts with different filters obtain an additional confirmation.

JEL Classification: E30

Keywords: Long-Run Macroeconomic Relations, Neoclassical Model of Growth, Economic Fluctuations.

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Growth and Cyclical Fluctuations in Spanish Macroeconomics Series*

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This paper provides an empirical description of some stylized facts of growth for the Spanish economy with the purpose of evaluating the adequacy of the neoclassical model of growth as a structure on which we can build a theory of the economic cycle for the Spanish economy. On the other hand, the description of the fluctuations in the Spanish economy is expanded and analyzed by taking into account different theories developed in literature. In this work, we use three filters to remove trends from the data: first differences, Hodrick-Prescott filter and Baxter-King filter. The task here is to check whether the stylized facts keep, at least, qualitatively equal with different filters, so that invariant stylized facts with different filters obtain an additional confirmation.

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1 Introduction

The research of economic cycles started by Kydland and Prescott (1982) and Long and Plosser (1983) is based on the neoclassical model of aggregated economic growth (see Solow, 1956; Swan, 1956; Meade, 1961) with exogenous technological progress. The main goal is to enrich this basic structure in order to get in charge of the fluctuations of the economic variables around an exogenous trend.

The method used in economy, and more precisely in the literature of economic cycles, is a deductive one. The theories or models are interpreted as measuring instruments used to deduce implications of the theory. The theory of growth is the basic theory on which models are built in the literature of economic cycles. This theory provides the instructions to build

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artificial economies that allow us to point out some matters of interest of the economic cycle. Quantitative answers to this question are deducted from such artificial economy.

An artificial economy describes the way in which the economy evolves, therefore it will just be a dynamic system. In general, in R.B.C. literature they are considered economies subject to exogenous stochastic disturbances. Thus, we have one or several exogenous sources of stochastic disturbances that affect a great part of the dynamic system. Moreover, the dynamic system constitutes a mechanism that spreads the disturbances that will end up affecting all the variables that constitute the system.

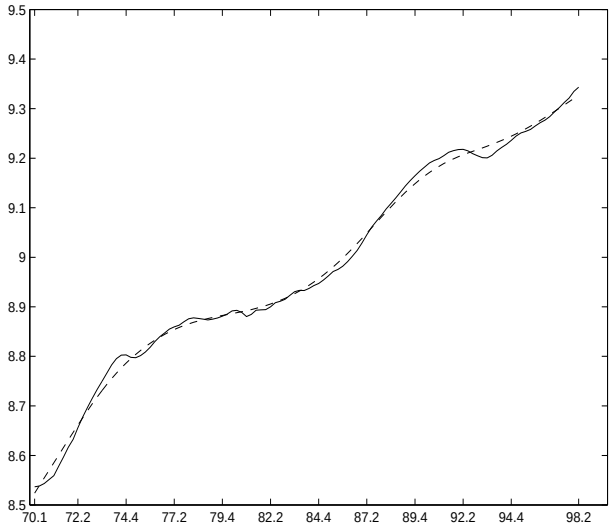
What has been described in the previous paragraph is what could be called the "disturbance-spread mechanism-outcome" pattern. When it is about matters related to the business cycle, the task of the economic analyst is to theorize according to the "disturbance-spread mechanism-outcome" pattern, so that it is possible to deduce answers to some relevant question.

The viewpoint of R.B.C. literature is that growth and fluctuations are not different phenomena that can be studied separately. On the contrary, fluctuations in growth rates of the Gross Domestic Product (G.D.P.) and of other macroeconomic aggregated ones have to be interpreted as reactions of the economic system to stochastic changes in the growth rate of the Total Factor Productivity (T.F.P.). The basic hypothesis is as follows: T.F.P. changes from period to period for different reasons that do not depend on the running of the markets (tax policies, technological innovation, changes in the regulations of international trade, wars, socio-political conflicts, etc). These fluctuations of T.F.P. determine changes in the decisions to work, consume, invest, etc., once they are admitted by the economic agents. The reactions of the economic agents may be immediate or may delay for several periods, depending on technological and institutional factors. All this determines fluctuations that can be seen in employment, consumption, investment, relative prices, etc. On average, the economic system keeps growing and developing at a rate that is constant and is the same as the expected growth rate of the T.F.P. This fact determines the observable long-term ratios for the main economic amounts. The choice of a particular theory of economic growth should be based on its being able to reproduce the main characteristics of growth observed for the economy to be studied. The attitude of R.B.C. literature has been to accept the so-called "stylized facts of growth" as the main characteristics of the growth of developed economies. Thus, the most widespread practice in the profession is to use the neoclassical model of growth as the structure for these theories to be built on. The main reason for this choice is that this theory reproduces such "stylized facts of growth"

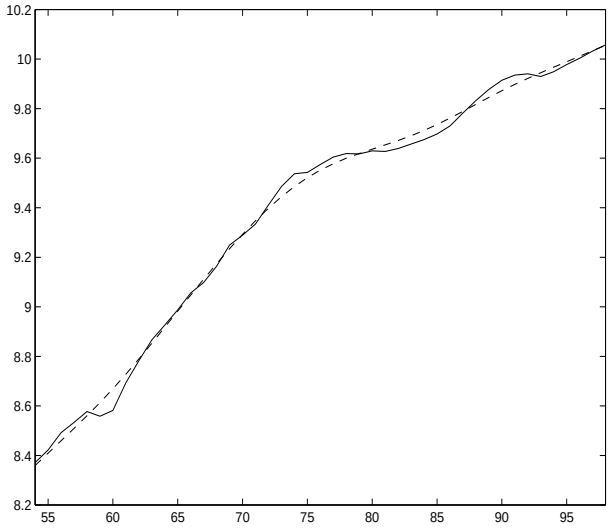
> "These observations, labeled by Nicholas Kaldor (1957) the 'stylized facts' of economic growth, became the benchmarks of the theory of economic growth. These observed regularities suggested economic laws at work that could be captured in formal models... The neoclassical model of capital accumulation reproduces many of the stylized facts about economic growth and is consistent with many features of actual growing economies" (Cooley and Prescott, 1995, pags. 3,4).

For all these reasons, when we want to study the cyclical behaviour of macroeconomic variables, it becomes necessary to characterize the growth of the economy coherently on a long term basis, that is to say, in its growth pattern. Therefore, we start the analysis by considering long-term trends of the Spanish economy and of the so-called "stylized facts of growth".

The rest of the paper is organize as follows. Section 2 analyzes the long-term trend of



1.1: Logarithm of the quarterly real GDP and its trend ($\lambda = 1600$).



1.2: Logarithm of the yearly real GDP and its trend ($\lambda = 100$).

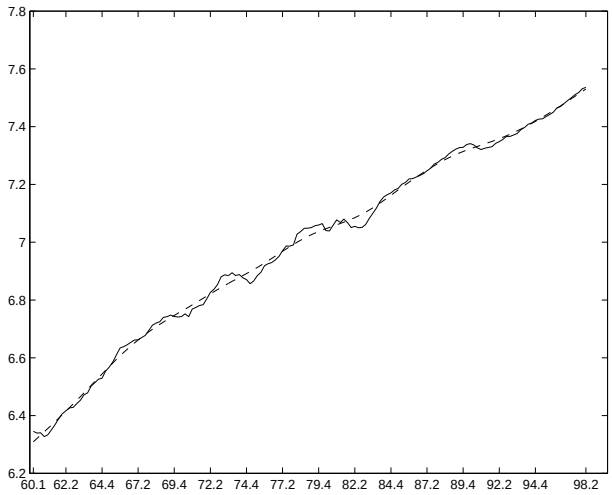
Figure 1: The trend of the spanish GDP. Hodrick-Prescott filter.

Spanish GDP. Section 3 studies the so-called "stylized facts of growth". Section 4 reports another characteristics of balance growth in the neoclassical model of growth. Section 5 discusses empirical methods for the analysis of the cycle. Section 6 presents and discusses facts about the cyclical behaviour of some macroeconomic temporal series.

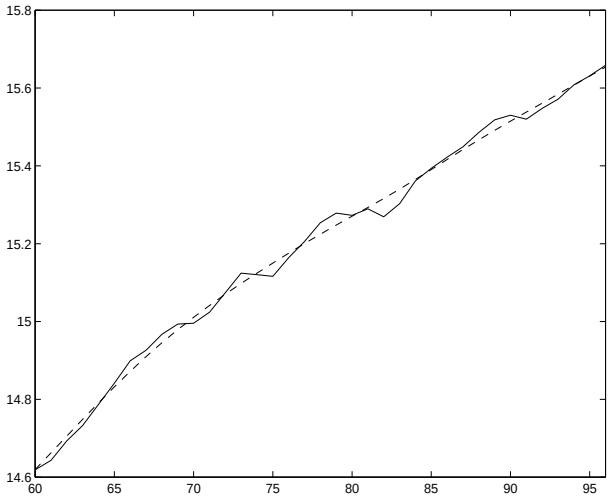
2 The Trend of the Spanish GDP

Figure 1 shows the evolution of the Spanish GDP and its trend for quarterly and yearly periodicities. The different historical episodes that have affected the Spanish economy in the last 44 years can be observed in it. The strong growth after the Stabilization and Liberalization Plan of 1959 that implies an important openness of the Spanish economy; the reduction of the growth that follows the rise of crude oil prices in 1973-79 and the social conflicts generated by the restoration of the parliamentary monarchy; a new period of strong growth in the mid 80's concurring with a new openness of the economy: the incorporation of Spain in the E.E.C. in 1986; the strong production fall associated with the recession experienced by Europe in the early 90's and a new period of strong growth that has lasted up to today.

If we observe both the trends of the quarterly and yearly GDP carefully, we can see that both suggest different phases of growth. The trend of the yearly GDP suggests two phases in which the economy seems to grow at different rates with a turning point in the mid 70's. However, the trend of the quarterly GDP suggests three different phases in the growth rate of the economy: the first one lasts up to the mid 70's, the second one from the mid 70's to the mid 80's and the third one from the mid 80's to nowadays. This raises two natural questions. The first one is whether it is reasonable to modelize the movement of the Spanish economy along the 44 years as directed by the same subjacent trend. If the answer to the



2.1: Logarithm of the quarterly real GDP and its trend ($\lambda = 1600$).



2.2: Logarithm of the yearly real GDP and its trend ($\lambda = 100$).

Figure 2: The trend of the U.S. GDP. Hodrick-Prescott filter.

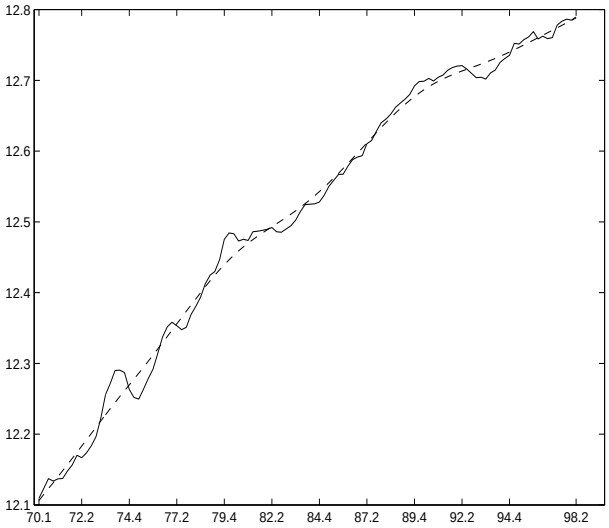
former question is a negative one, as it seems to be suggested by the data, a second question arises: What is, then, the model of trend that can best characterize the real long-term trend of the Spanish economy?

The case of the USA can be considered in order to illustrate the importance of these questions. In the case of the USA the problem of identifying one only long-term growth trend does not seem to exist, or at least, it seems to have an easy solution

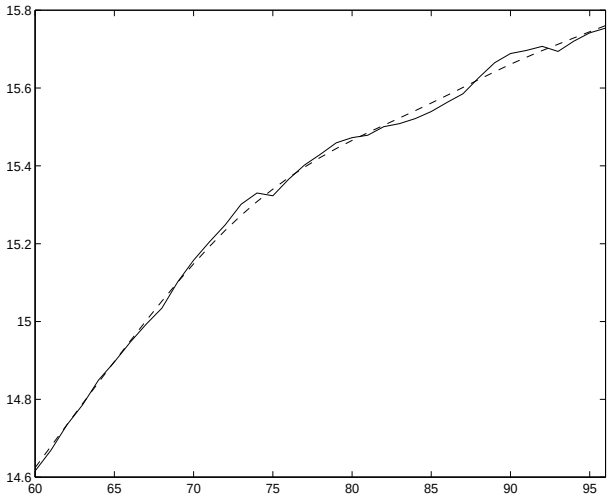
Figure 2 shows the evolution of the real USA GDP. Some of the episodes commented for the Spanish economy can be easily found in it, but it does not seem to be so easy to observe so clearly marked phases in the evolution of the trend. In figure 2 it is not easy to see the change that the slope of the trend experiences in the mid 70's because of the size of the sample. This provides a lot of literature in an effort to find the reason for such a fall. Anyhow, such a great difference between the yearly trend and the quarterly one cannot be seen, whereas in the Spanish case it can.

On the contrary, in figure 3 we can see the behaviour of the French GDP for similar periods. As well as what was shown in the case of the Spanish and USA economies, the yearly French GDP shows a change in the rythm of growth in the mid 70's. However, the behaviour of the trend of the quarterly French GDP shows some similar phases to the Spanish one, suggesting that it is a European phenomenon, instead of a particular fact of the Spanish economy.

On following this intuition, it becomes necessary to try to separate the different long-term subtrends of the Spanish economy by means of statistic instruments. From a theoretical point of view, this is a reasonable approach because the expected value of the long-term growth rate is not only a function of the exogenous technological progress, but also of the mechanisms of adoption of innovations, the level of flexibility and commercial openness of the economy, the social relations, the existing mechanisms for labour recruitment, etc. All this has remained stable in the USA for the last 50 years. The very few changes have been very slow and



3.1: Logarithm of the quarterly real GDP and its trend ($\lambda = 1600$).



3.2: Logarithm of the yearly real GDP and its trend ($\lambda = 100$).

Figure 3: The trend of the French GDP. Hodrick-Prescott filter.

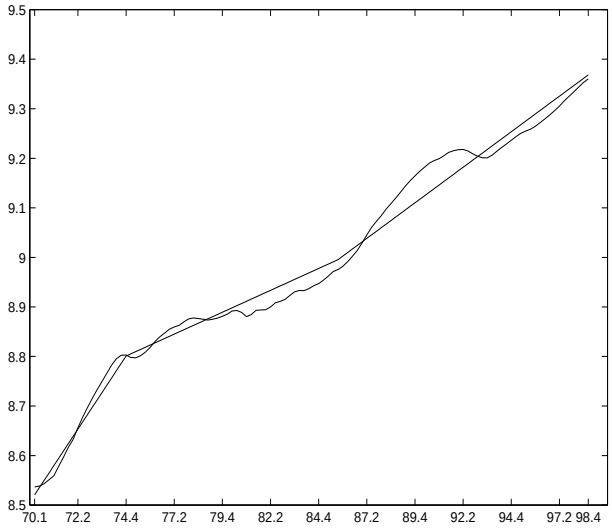
insignificant. The same thing cannot be said in the case of the Spanish economy as it has already been pointed out. The openness of the 60's changed the relations of the Spanish economy with the rest of the world drastically. The crude oil crisis of the 70's, along with the change in the political system and the achievement of deep changes in labour relations caused another gradual change in the system. Finally, the progressive liberalization of the economy, that starts when Spain becomes a member of the EEC in 1986 and has not finished yet, determines the third different adoption mechanism of exogenous innovations.

On taking this into account, we try to estimate a linear trend of each of the two (three) subsamples identified in the yearly (quarterly) data: 1954-1974 and 1975-1996 for the yearly data and 1970-1974, 1975-1985, 1986-1998 for the quarterly ones. The outcome of the estimation can be found in table 1, along with the values of the statistical tests. The trends can be seen in figure 4.

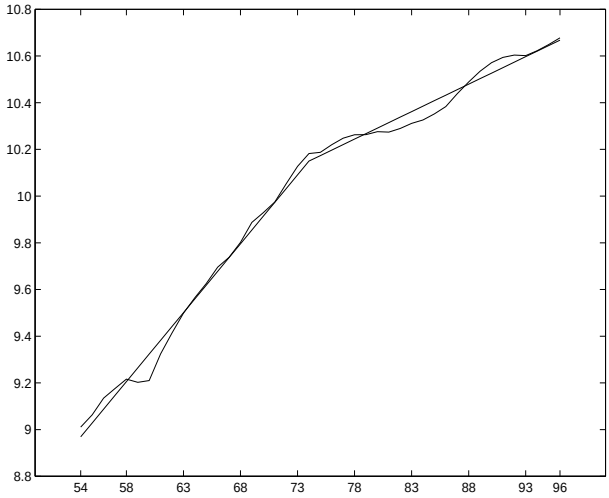
β coefficients of the trends are interpreted as trend growth rates and β_x coefficients as the changes of these growth rates associated with break points. All coefficients are significant and the tests against the null hypothesis that there is one trend alone reject such null hypothesis.

Another approach to those differences in the growth rate is to calculate the growth rate of the GDP. This growth rate is shown in figure 5, along with the average for the periods formerly mentioned.

What is interesting in dating the evolution of the GDP are the questions raised about the nature of the trend and the cycle of the Spanish economy. Despite the determination of the output trend is an open matter for the profession, it seems easy to suspect that the trend of the Spanish GDP shows important changes in its growth rate. On the other hand, these changes in the linear trend growth rate may suggest the existence of important non-linearities in the trend, as the trend *à la* Hodrick-Prescott suggests. Anyway, it is necessary to have a theory that can explain these changes in the trend if we want to understand the cyclical behaviour of the Spanish economy well.



4.1: Logarithm of the quarterly real GDP and three linear trends.



4.2: Logarithm of the yearly real GDP and two linear trends.

Figure 4: Linear trends for Spanish GDP.

Regression with linear trends		
$\log(\text{GDP}_t^q) = \alpha^q + \beta^q t + \beta_{75}^q t_{75} + \beta_{86}^q t_{86} + u_t^q$		
$\log(\text{GDP}_t^a) = \alpha^a + \beta^a t + \beta_{75}^a t_{75} + u_t^a$		
Parameter	Estimation	t-ratio
α^q	8.50	784.1
β^q	0.0147	21.10
β_{75}^q	-0.0103	-12.37
β_{86}^q	0.0028	7.78
α^a	8.91	575.7
β^a	0.059	55.77
β_{75}^a	-0.0355	-19.76
Chow Test $H_0 : \log(\text{GDP}_t^q) = \alpha^q + \beta^q t$ $F_{2,T-4} = 74.82$		
Chow Test $H_0 : \log(\text{GDP}_t^a) = \alpha^a + \beta^a t$ $F_{2,T-4} = 181.4$		

Table 1: Linear trend over the logarithm of the Spanish GDP. The superindexes refer to the periodicity of the data of the regression: quarterly ones (q) and yearly ones (a). The $t_x$variables are trends that start the x year and are zero for former periods.

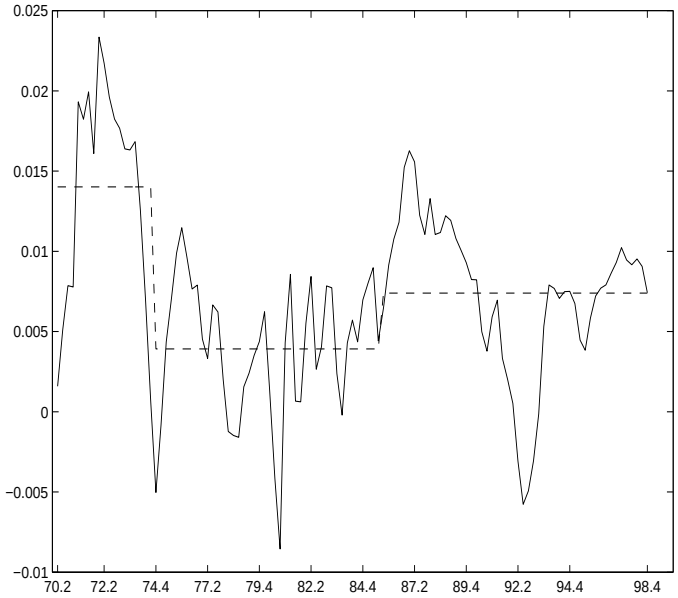


Figure 5: Difference of the logarithm of the real GDP of the Spanish economy.

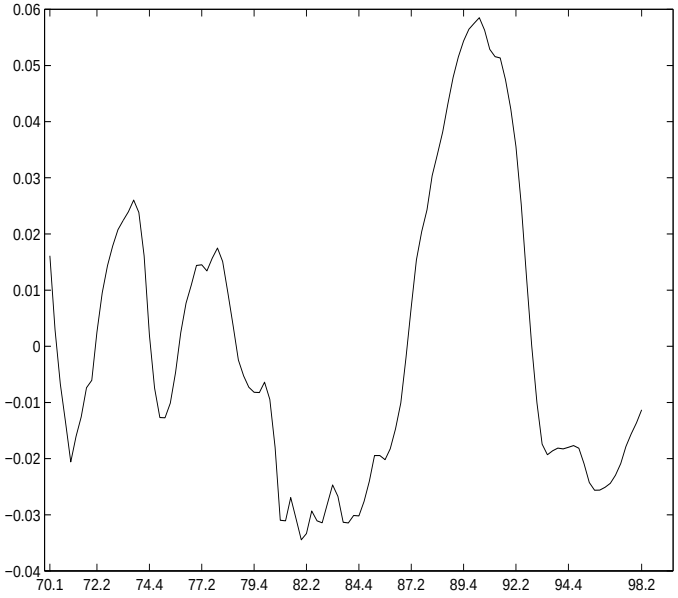


Figure 6: Residuals of $\log(\mathrm{GDP}_t^q) = \alpha^q + \beta^q t + \beta_{75}^q t_{75} + \beta_{86}^q t_{86} + u_t^q$

Thus, we may think of different hypoteses about the nature of the trend and the cycle that could be compatible with the previous observations:

1.- The trend is a stochastic one, that is, the series levels show unitary roots. At the same time the growth rate shows segmentations or changes in its average value that can be of a determinist or stochastic nature.

2.- The trend is a determinist linear one with determinist or stochastic segmentations in the growth rate, that is, the series levels are stationary around a linear temporary polinomy and the growth rate shows either determinist or stochastic changes in its average value.

3.- The trend is a determinist non-linear one.

These alternatives can be equivalent when we observe them, but their consequences are very different from the viewpoint of the economic theory. That is the reason why they have to be taken into account when the task is to build models. Considering hypothesis 1, if the series levels show more than one unitary root, the changes in the long-term growth rate caused by shocks mean that such a rate does not reach an average value and the uncertainty about its long-term value becomes infinite. The situation is less pessimistic when there is one only unitary root. In this case the existence of shocks does not allow the series level to go back to an average value, unlike the growth rate. In RBC literature this situation has been modelled within the frame of the neoclassical growth pattern considering that TFP follows a random walk with drift. When TFP follows a random walk, long-term levels of the variables of the model also follow a random walk with drift. See King et al. (1991) for a discussion in detail on this approach. On the other hand, in stochastic growth literature, endogenous growth patterns can also be compatible with the existence of a unitary root in the series. Fatás (2000) shows the latter approach. When RBC literature considers the growth rate exogenously determined, it has not taken into account the possibility that long-term values of growth rates may be affected by changes that have permanent effects on such values. This means that stochastic or determinist changes may make the long-term value of the growth rate change. There is no doubt that this viewpoint implies the need to distinguish between shocks that provoke the segmentation of the long-term growth rate and shocks with short-term effect that would govern the cyclical behaviour of the variables. From the viewpoint of the economic analysis, shocks can be considered exogenous whenever they cause segmentations. They would be associated with changes in the structural parameters of the economy whereas temporary shocks would be associated with temporary changes in TFP. The latter point of view is the one adopted by RBC literature. Several econometric studies have found that this approach represents the behaviour of the Spanish GDP accurately. See Espasa (1989), Andrés et al. (1990) and Dolado and Sicilia (1995). The work of Martínez and Espasa (1998) represents a step ahead, where it is additionally considered that the cyclical component shows a non-linear asimetric behaviour in the sense that the behaviour pattern of the expansions is different from that of the recessions.

On the contrary, if hypotheses 2 and 3 are accepted, the series levels of production would be determined by a temporal polinomy plus a stochastic component. In the simplest version, the long-term output growth rate is a constant.

For example, RBC models with neoclassical technology, deterministic labour aumenting technical progress, and a TFP that evolves according to a stationary stochastic process are compatible with this approach. In these models, series are produced that grow in a long-term at a constant rate, determined by the growth rate of technical progress. Segmentations in the growth rate of output are interpreted as changes in the technical progress growth rate of the economy. The main difference between this and hypothesis 1 is that in this case the

series level is not affected by transitory shocks in TFP, so that the effect of these shocks disappears making the level go back to the one determined by the temporal polinomy.

The differences that can be pointed out between the behaviour of the trends of the Spanish and USA economies suggest that different trend models of each of these economies are needed. But from the viewpoint of RBC literature these different trend models can be interpreted as different shocks. It can be considered that an economy is different from another one because it shows differences in the "perturbation-spread mechanism-outcome" pattern. However, the outcome can be observed and we can see different outcomes for different economies either because the nature of the shocks is not the same, or because the spread mechanism is different or because both the nature of the shocks and the spread mechanism are different.

It is necessary to adopt an attitude to the differences observed in the behaviour of the aggregated variables in relation to what was observed in other similar economies. A priori several conjectures about the nature of these particularities can be suggested:

Conjecture 1. ***Measuring errors***. *The measuring of the macroeconomic variables for the Spanish economy has important differences, if we compare it with other economies, that allow us to see a different dynamic behaviour in the aggregated variables.*

Conjecture 2. ***Spain is different***. *The Spanish economy has different principles from those in the rest of the decentralized economies.*

Conjecture 3. ***History and environment matters***. *The Spanish economy has the same principles as other decentralized economies, but it gets different shocks and the spread mechanism shows some specific features.*

Conjecture 1 refers to the fact that we may observe a different behaviour in the aggregated series of the Spanish economy because the way the aggregated series are built for the Spanish economy is different. There are studies that show deficiencies in the creation of the aggregated measures of the Spanish economy basically in the the Quarterly National Accounting (QNA). See Cabo (1998) and Gómez and Bengoechea (2000). QNA uses quarterly indicators to disaggregate the yearly amounts into the quarterly ones by means of a temporary disaggregation method. This temporary disaggregation method is applied to trend-cycle series of the indicators and not to the indicators themselves. The problem may be that there are changes in the measuring systems of the economic activity or that the series treatment methods induce changes in the quarterly measures.

Conjecture 2 represents a case in which either the agents of the Spanish economy behave in a non-compatible way with the postulate that the agents work coherently in order to reach the pursued goal —rationality—, or the interaction among the action of the agents that perform in the Spanish economy —equilibrium— is not well adjusted to any of the notions developed by the profession to capture the fact that the economic performance depends on the actions of all the members of society. If this were so, it would be natural to think that the behaviour of the aggregated variables of the Spanish economy is different from that of all the rest of the decentralized economies in the world.

Conjecture 3 means that the economic agents of the Spanish economy are as rational as those in any other decentralized economy. The markets (when they exist) work like the ones in any other decentralized economy. However, the sources, the nature of shocks and some aspects of the spread mechanism may be different.

As for the different sources of shocks, they can be identified as a higher **degree of openness** of the economy and in a higher influence of the **public sector**. The openness of the Spanish economy starts in 1959 and has had several important episodes ever since. The

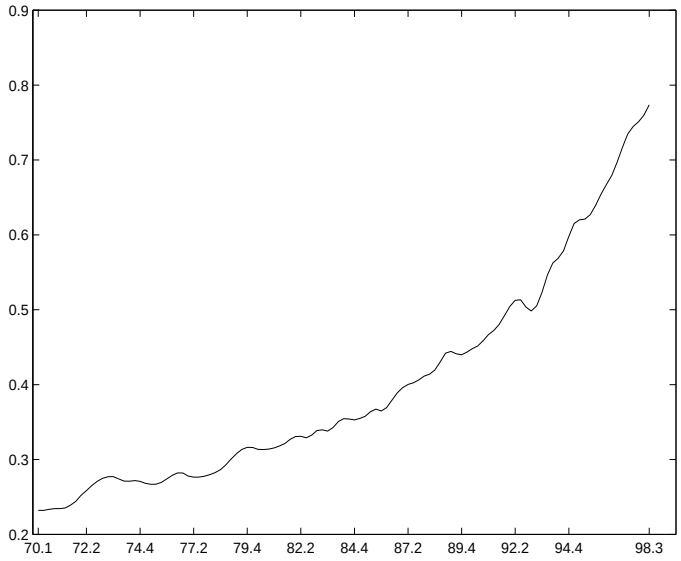


Figure 7: Ratio between the sum of exports and imports and GDP of the Spanish economy. Constant prices of 1986. Source: INE and own computations.

last one was when Spain became a member of the EEC in 1986. Figure 7 gives an outline of the level of openness of the Spanish economy and how it has been increased in the last decades.

The openness of the economy creates links with other economies that are a potential source of shocks that another closer economy does not have. Additionally, the Spanish peseta enters the European Monetary System.

On the other hand, the public sector has become increasingly more important in the Spanish economy with the consequent increase of the tax pressure. It can be said that Spanish society started the construction of the so-called "Welfare State" in the 80's. Besides that, there has been a drastic, though incomplete, change in the nature of the state since the late 70's, partly due to the plurinational and pluricultural aspect of the society managed by the Spanish state: the state was centralized, protectionist and authoritarian and became more decentralized, more competence challenging and more democratic. This transformation has created political entities, Regional Governments (Comunidades Autónomas, CC.AA.), with a great spending and borrowing capacity. This implies that CC.AA. are added to the potential source of shocks that the central state represents. Figure 8 shows how important the public sector is becoming in the Spanish economy.

The differences in the spread mechanism may be **technological** ones: in the last decades there has been a very important substitution process of labour for capital as seen below. The **sectoral composition** is also different in the Spanish economy and there has been a great transformation in the sectoral composition of the economy —specially in terms of employment—, in which the agricultural sector has rapidly become less important while the service sector has increased. There are also some aspects of an institutional nature. The labour market shows very strong institutional characteristics. The first one can be the collective negotiation, that is to say, the social agents (unions, employers' associations, and sometimes the government) negotiate labour conditions at state, sectoral and firm level.

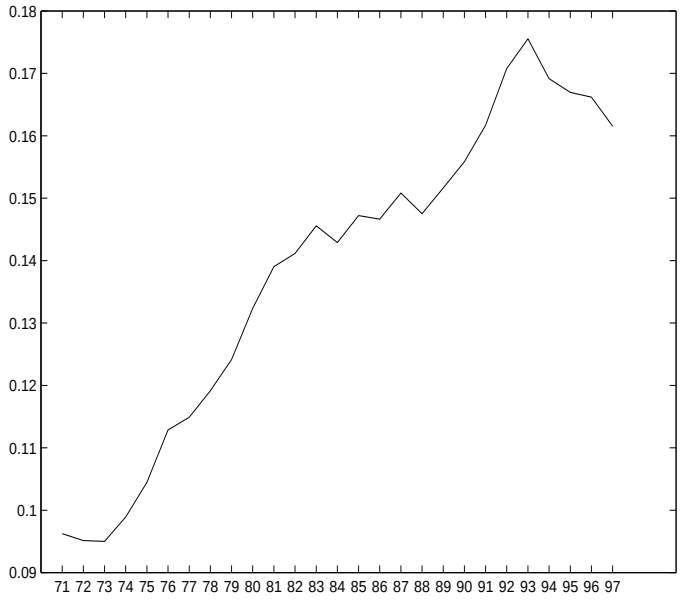


Figure 8: Ratio between public expenditure and GDP of the Spanish economy. Constant prices of 1986. Source: INE and own computations.

Moreover, the use of negotiation levels has been changed. After 1987, state negotiations decrease in importance and negotiations become basically sectoral at provincial level. Another important feature is the existence of dismissal costs and benefits for unemployed people, that have also been modified in the last decades. Another important feature has been the **liberalization and creation of financial markets** in the last few years.

Such characteristics introduce differential features in the "perturbation-spread mechanism-outcome" pattern. It is necessary to take them into account if the task is to build a useful theory to understand the way the Spanish economy works.

The rest of this paper is dedicated to explore the most important regularities of the Spanish macroeconomic series, if we consider that regularities are a set of statistic properties of temporal series. We will always try to see this regularities from the viewpoint explained formerly, that is, which of these regularities differ with the predictions from established theories in order to explain those phenomena in most economies and which ones do not. In other words, those elements of the spread mechanism of the Spanish economy that are different from those of other economy are required. In the latter case, it will have to be established whether they answer conjecture 1 or 3, because number 2 has been disregarded.

3 Stylized Facts of Growth

In this section the so-called "stylized facts of growth" for the Spanish economy are studied in relation with the neoclassical growth model, in view of their theoretical relevance.

As it has been said in the previous section, it is necessary to reconcile the artificial economies that are built in order to study the fluctuations or the economic politics with the observations on growth. Solow (1970) shows six observations made by Nicolas Kaldor on the growth of developed industrial economies, as the facts that every good growth model must

be able to reproduce. The four first ones describe an economy that shows a balanced growth, that is to say, the economy is in steady state.

1.- The real production per employee, or per hour-worked, grows at a more or less constant rate in long periods of time.

2.- The real capital stock grows at a more or less constant rate higher than the labour growth rate. That is the reason why the capital-labour ratio grows at a constant rate.

3.- Growth rates of real production and the capital stock tend to be the same, what implies a ratio between capital and output stationary.

4.- The rate of profit on capital has a horizontal trend.

5.- The growth rate of the per capita output greatly varies a lot from one country to another.

6.- Economies with high rates of profit have high investment rates over output.

In addition, from the viewpoint of the neoclassical growth pattern with exogenous technical progress, the growth rates of the output per unit of labour and the capital-labour ratio have to be exactly the same, and they must also be the same as the growth rate of technical progress.

3.1 The Real Output per Employee

Figure 9 shows the ratios of the real Spanish quarterly GDP with the amount of employees and the total amount of hours worked by those employees, as well as its growth rates. If we accept that the 1970-1998 and 1976-1996 samples are suitably long periods of time, such figures seem to suggest that the growth rates show an average change in the mid 80's. A hypothesis testing that the average of the 1970.1-1985.4 sample is the same as the average of the 1986.1-1998.2 sample is carried out in order to confirm so. Table 2 shows the contrast[1] results that reject the hypothesis that the averages are the same in both cases.

3.2 The Capital/Labour Ratio

Figure 10 represents the capital ratio of total worked hours and its growth rate. The capital-hours ratio over the total hours also shows at least a change in its growth rate in the mid 80's, like in the case of the output per employee. The corresponding test of means of equality rejects the equality between the previous and posterior means to 1986 (table 3). The visual inspection of the ratio suggests a stable growth rate until the mid 80's and a fall that lasts until the early 90's when it increases again.

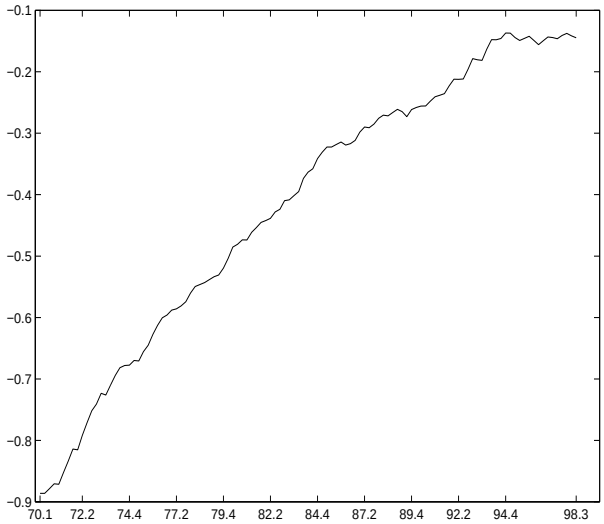
[1] The acceptance region is calculated

$$\pm t\ \hat{s}_T \left(\frac{n_1+n_2}{n_1 n_2}\right)^{\frac{1}{2}}$$

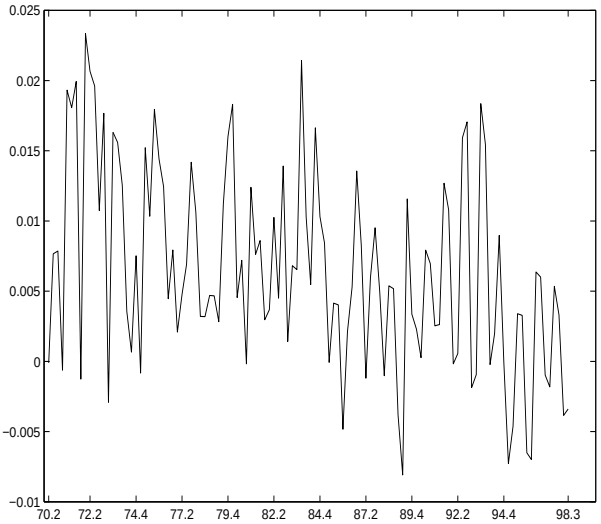
where $t = 1.9939$ is the value of the t-student distribution with $n_1 + n_2 - 2$ degrees of freedom such that $(-t; t)$ has 95% of the probability and

$$\hat{s}_T^2 = \frac{(n_1-1)\hat{s}_1^2 + (n_2-1)\hat{s}_2^2}{n_1+n_2-2}$$

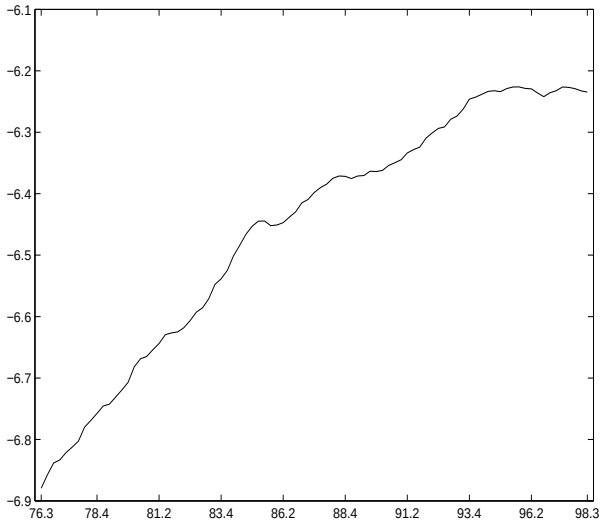
where n_1, n_2 are the sizes of the subsamples and $\hat{s}_1^2$ y $\hat{s}_2^2$ the respective sample variances. The null hypothesis of equality of the mean is accepted if $\overline{X}_1 - \overline{X}_2$ belongs to the acceptance region.



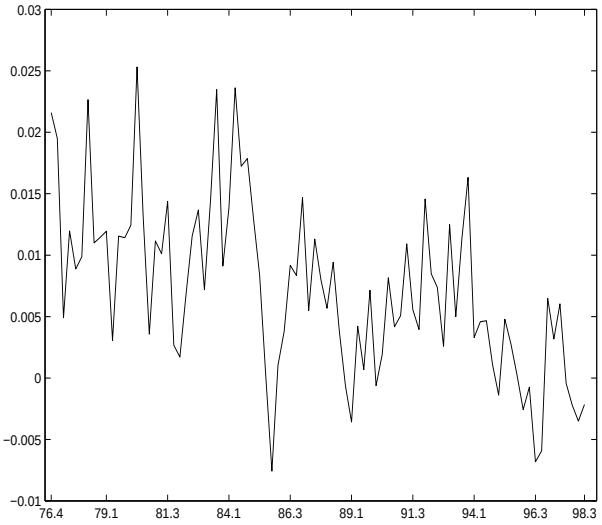
9.1: Logarithm of the real GDP per employee.



9.2: First difference of the logarithm of the real GDP per employee.



9.3: Logarithm of the real GDP per hour worked by employees.

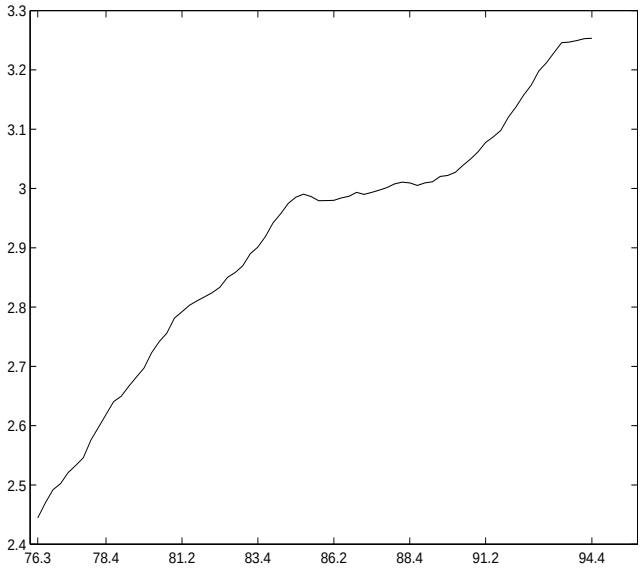


9.4: First difference of the logarithm of the real GDP per hour worked by employees.

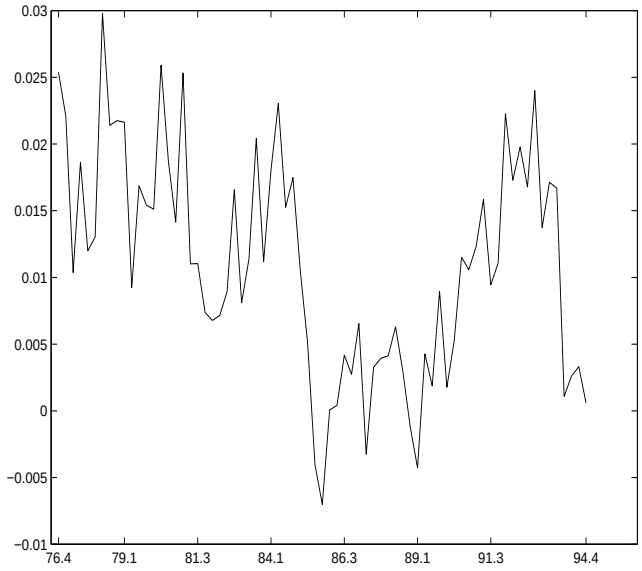
Figure 9: Source:I.N.E. and own computations.

GDP per employee	
$\overline{X}_1$	0.0090
$\overline{X}_2$	0.0034
$\overline{X}_1 - \overline{X}_2$	0.0056
Acceptance region	(-0.0025 0.0025)
GDP per hours worked	
$\overline{X}_1$	0.0116
$\overline{X}_2$	0.0043
$\overline{X}_1 - \overline{X}_2$	0.0073
Acceptance region	(-0.0026 0.0026)

Table 2: Test for equal average of the growth rates of output per employee and output per hours worked.



10.1: Logarithm of the capital stock/total hours worked ratio.

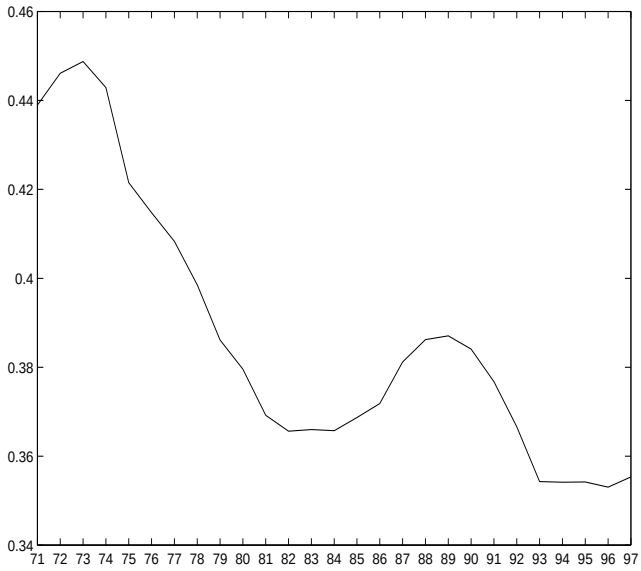


10.2: First difference of the logarithm of the capital stock/total hours worked ratio.

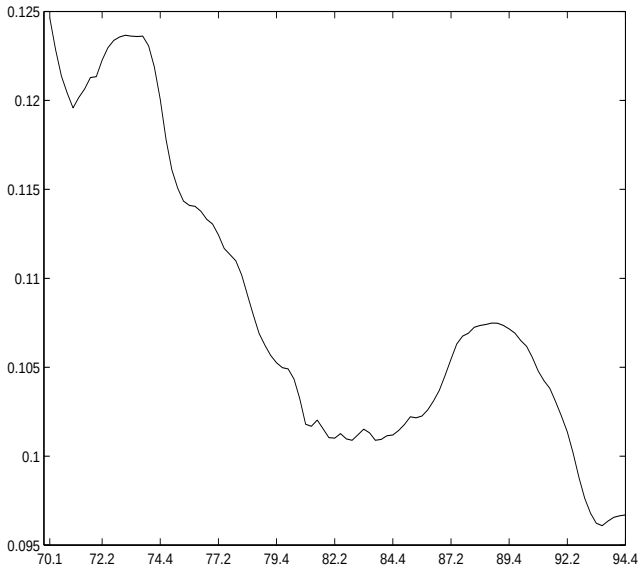
Figure 10: Source: NA., B.B.V. and own computations.

Capital/labour	
$\overline{X}_1$	0.0145
$\overline{X}_2$	0.0076
$\overline{X}_1 - \overline{X}_2$	0.0069
Acceptance region	(-0.0035 0.0035)

Table 3: Test for equal average of the growth rate of the capital/hours worked ratio.



11.1: GDP/capital stock ratio. Yearly series.



11.2: GDP/capital stock ratio. Quarterly series.

Figure 11: Source: NA., B.B.V. and own computations.

3.3 The Capital/Output Ratio

The GDP over the capital stock is shown in figure 11. When we observe the figure it seems easy to conclude that such a ratio shows a very strong trend in the 70's and a more stable behaviour from the 80's with cyclical fluctuations, growing during the boom of the 80's and falling during the recession of the 90's. It can not be stated that it is constant in the 1970-1994 sample, showing a strong increase in the intensity of capital in the economy in the 70's. This feature coincides with what was observed for most developed economies. See Caballero and Hammour (1997), for instance.

These results allow us to see a change in the long-term growth rate of the output per employee, the output per hour worked. This suggests a change in the factors that determines the steady state growth rate of the economy. From the viewpoint of the neoclassical growth pattern, the long-term growth rate of output per labour unit, would be exogenously determined by the technical progress growth rate. From this viewpoint, this change in the growth rate would have to be interpreted as a change in the technical progress growth rate.

	1976.1-1994.4.	1986.1-1994.4.
	σ	σ
ΔTFP	0.5121	0.3938

Table 4: Standard deviation of TFP calculated by following (2).

Next section looks to a standard measure of the growth rate of technical progress.

3.4 Total Factor Productivity

The growth rate of technical progress plays a very important role in the neoclassical growth model. That is the reason why it is necessary to have a measure of the technical progress in the economy. The part of output growth that is not explained by productive factors is usually associated with technical progress. Thus, a non-parametric way of measuring the TFP can be obtained from the production function

$$Y(t) = A(t)F(K(t), H(t)) \tag{1}$$

the total differential of the logarithm of (1) is

$$\frac{\dot{Y}(t)}{Y(t)} = \frac{\dot{A}(t)}{A(t)} + \frac{\partial Y}{\partial K}\frac{K(t)}{Y(t)}\frac{\dot{K}(t)}{K(t)} + \frac{\partial Y}{\partial H}\frac{H(t)}{Y(t)}\frac{\dot{H}(t)}{H(t)}$$

where the points over the variables mean differential with respect to time. On the right hand side of the expression we can see the addition of the growth rate of the efficiency variable and of the factors of production. The latter ones are weighted by their output elasticities. The output elasticities are not observable. However, if the factors are paid to their marginal outputs, we can say that

$$\frac{\dot{A}(t)}{A(t)} = \frac{\dot{Y}(t)}{Y(t)} - s^k(t)\frac{\dot{K}(t)}{K(t)} - s^h(t)\frac{\dot{H}(t)}{H(t)} \tag{2}$$

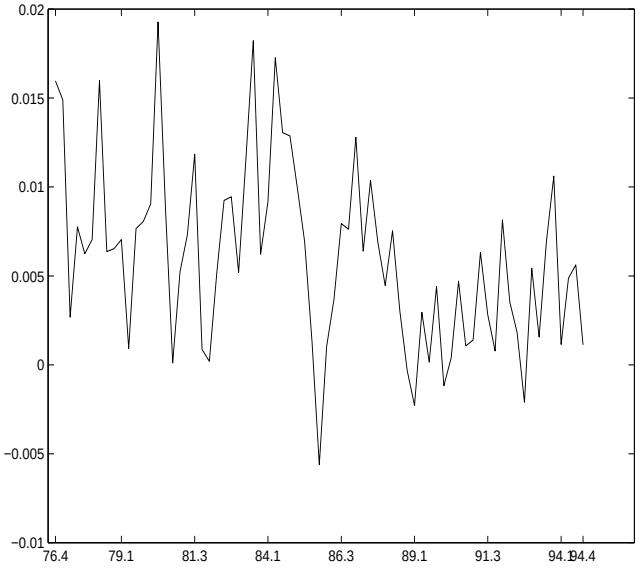
where $s^k(t)$ y $s^h(t)$ represent the shares of the factors in total income. This expression is in continuous time. If we want to use it with observed data, we should approximate the growth rates by the differences in the natural logarithm of the variable and the shares of the factors by the average of the shares observed in each period, that is, the discreet participation of the capital in income will be $(s^k_t + s^k_{t-1})/2$. Figure 12 shows the growth rate of the variable A_t calculated like this.

Table 4 presents the standard deviation of the growth rate of the TFP. Both the figure 12.1 and table 4 seem to suggest a change in the volatility and in the growth average of the Solow residual since the mid 80's.

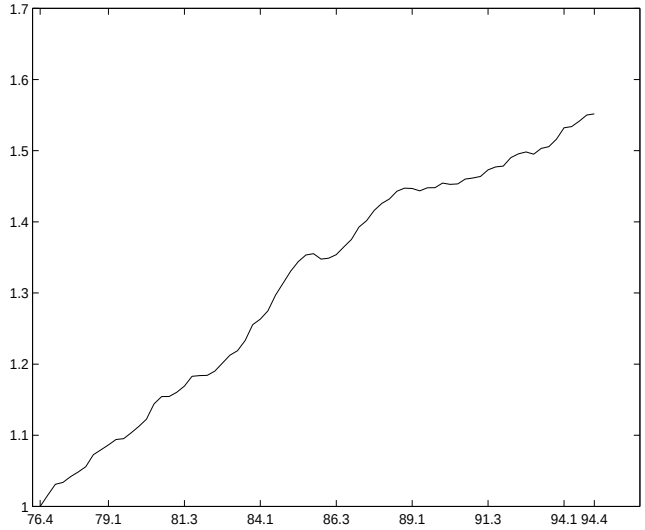
Two tests of equality of means and variances, taking 1976.4-1985.4 and 1986.1-1994.4 as subsamples, are shown to verify this graphic impression. Such tests[2] are presented in table 5 and confirm that the hypothesis that the variances and the means are the same is rejected.

A_t is interpreted as technical progress. From the viewpoint of the neoclassical growth pattern the growth rate of the technical progress determines the growth rate of output per

[2]The acceptance region of equality of variances is calculated as (F_a, F_b) where F_a and F_b are the values of the distribution function of a Snedecor F with $n_1 - 1$ and $n_2 - 1$ degrees of freedom such that $Pr(F_a \leq F \leq F_b) = 0.95$.



12.1: Growth rate of the Solow residual calculated according to (2).



12.2: Solow residual calculated by integrating the growth rate (2) with $A_0 = 1$.

Figure 12: Source: NA, BBV and own computations.

Test for equality of means variances	
ΔTFP	
$\hat{\sigma}_1^2/\hat{\sigma}_2^2$	2.6861
Acceptance region	(0.516 2.05)
Test for equality of means	
$\overline{X}_1$	0.0081
$\overline{X}_2$	0.0039
$\overline{X}_1 - \overline{X}_2$	0.0042
Acceptance region	(-0.0022, 0.0022)

Table 5: Test for equality of means and variances of the growth rate of the Solow residual.

	ΔTFP	**ΔGDP/hours**	**ΔCapital/hours**
Average$(\overline{x}_i)$	0.0081	0.0116	0.0145
Standard deviation (σ_i)	0.0055	0.0070	0.0079
F	8.0472		
Acceptance region	$F < 3.0781$		

Table 6: Test for equality of means for the growth rates of TFP, GDP/hours worked and capital/hours worked. Sample 1976.4-1985.4.

	ΔTFP	**ΔGDP/Hours**	**ΔCapital/Hours**
Average $(\overline{x}_i)$	0.0039	0.0061	0.0076
Standard Deviation (σ_i)	0.0037	0.0046	0.0074
F	4.1741		
Acceptance Region	$F < 3.0804$		

Table 7: Test for equality of means for the growth rates of TFP, GDP/hours worked and capital/hours worked. Sample: 1986.1-1994.4.

labour unit and the growth rate of the capital/hours worked ratio, so that a central prediction of this model is the equality in the long-term of the growth rates of the technical progress, output per labour unit and capital per labour unit.

Tables 6 and 7 show the averages and the standard deviations of those variables for two different subsamples: 1976.4-1985.4 and 1986.1-1994.4. Since there is evidence of changes in the averages of these variables for those samples, the equality of the averages of the growth rates in each subsample is tested. In particular, we test the equality of the growth rates of TFP obtained from (2), the GDP/hours worked ratio, and the capital/hours worked ratio. The hypothesis of the average equality is rejected in both samples[3].

The acceptance region of the equality of means is obtained like

$$\pm t\ \hat{s}_T \left(n_1^{-1} + \kappa n_2^{-1}\right)^{\frac{1}{2}}$$

where $t = 1.9939$ is the value of the t-student distribution with $n_1 + n_2 - 2$ degrees of freedom such that the $(-t, t)$ interval has 95% of the probability and

$$\hat{s}_T^2 = \frac{(n_1 - 1)\hat{s}_1^2 + (n_2 - 1)\hat{s}_2^2/\kappa}{n_1 + n_2 - 2}$$

where $n_1 = 37$, $n_2 = 36$ are the sizes of the subsamples, $\kappa = \hat{\sigma}_2^2/\hat{\sigma}_1^2 = 0.3723 = 1/2.6861$, $\hat{s}_1^2$ and $\hat{s}_2^2$ the respective sample variances. The null hypothesis of equality of means is accepted if $\overline{X}_1 - \overline{X}_2$ belongs to the acceptance region.

[3]The F statistic is calculated

$$F = \frac{s_e^2}{s_R^2} = \frac{1/2 \sum_i^3 n(\overline{x}_i - \overline{x})^2}{1/3 \sum_i^3 \sigma_i^2}$$

where $\overline{x} = 1/3 \sum_i^3 \overline{x}_i$ and n is the size of the sample. Under the null hypothesis of equality of means, this statistic is distributed as a Snedecor F with 2 and $3n$ degrees of freedom. The acceptance region is calculated for a significance level of 0.05. For details on the tests, see Peña (1987).

3.5 Rate of Return on Capital

3.5.1 Rate of Return on the Total Capital

The aggregated output of the economy is obtained from the combination of two kinds of factors of production, physical capital and labour. If we admit that this output can be represented with a production function with constant returns to scale, the aggregated output can be broken down as follows

$$Y = F(K, H) = F_k K + F_h H$$

where F_k y F_h are the marginal productivities of each input. If we assume that the factor markets are competitive, both factors are paid to their marginal productivities and the previous expression can be written as follows

$$Y_t = R_t K_t + W_t H_t$$

where both addends represent the income of each productive factor. If we want to get a measure of R_t we should calculate

$$R_t = \frac{\text{Capital Income}_t}{\text{Capital Stock}_t}$$

In order to calculate the capital income from the information of (NA.) it is necessary to take into account the way in which some variables of NA are measured. NA calculates what is called Gross Surplus (GS) by substracting the Wage Earner's Remuneration (WER) from the Gross Value Added (GVA) to the cost of the factors of the economy (GVA_{cf}). This GS can be itemized in capital rents (RK), plus the full amount of taxes on capital income (TK), plus what NA calls mixed rents (MR), that are the income of the firms whose legal status coincides with its owner, that is, individual firms.

$$\text{GS} = \text{R.K.} + \text{T.K.} + \text{M.R.}$$

Therefore, mixed rents include capital income and those of the labour of the owner of the company. If we are interested in calculating the capital income of the economy, it is necessary to introduce some adjustment that can discount the part of the mixed rents that are income of the labour factor. Figure 13 shows the percentage of mixed rents in GVA_{cf}. The figure shows that mixed rents are a important component of total income and should be considered.

Three alternatives are proposed here in order to get a reasonable measure of the physical capital income

S1 To assume that the labour share in mixed incomes is equal to the labour share in the total income, that is

$$\text{Capital Income}_t = \text{GVA}_{\text{cf}\,t} - \text{WER}_t - (1 - \alpha_t)\,\text{MR}_t \tag{3}$$

with

$$(1 - \alpha_t) = \frac{\text{WER}_t}{\text{GVA}_{\text{cf}\,t} - \text{MR}_t} \tag{4}$$

h

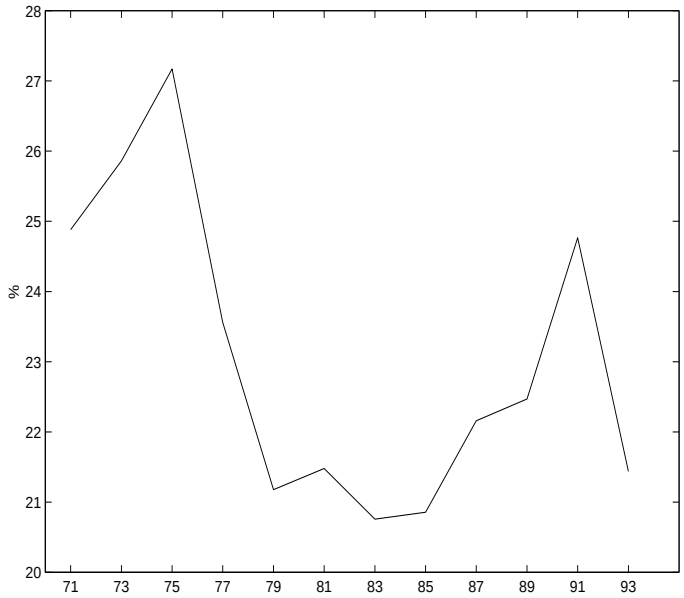


Figure 13: Percentage of the mixed rents of $\mathrm{GVA}_{\mathrm{cf}}$.

S2 To assume that the wage earned by non-salaried persons of the economy equal to the wage-earner's average wage, so that the measure of the capital income will be

$$\text{Capital Income}_t = \mathrm{GVA}_{\mathrm{cf}\,t} - \frac{\text{Employees}_t}{\text{wage-earners}_t}\mathrm{WER}_t \tag{5}$$

and the labour share implicit under this assumption is

$$(1-\alpha_t) = \frac{\frac{\text{Employees}_t}{\text{wage-earners}_t}\,\mathrm{WER}_t}{\mathrm{GVA}_{\mathrm{cf}\,t}} \tag{6}$$

S3 To assume that the labour shares in mixed rents is constant and to try with different values. Values 0.1, 0.3 and 0.5 will be used.

$$\text{Capital Income}_t = \mathrm{GVA}_{\mathrm{cf}\,t} - \mathrm{WER}_t - (1-\alpha)\,\mathrm{MR}_t \tag{7}$$

Alternative S1 deals with mixed rents as if they were the total income of the companies it refers to and considers that the distribution between capital and labour income is equal to the one at aggregated level. If we take into account that the mixed rents are not total income of the companies because the part that corresponds to salaried labour has already been discounted, this alternative will overestimate the labour income included in MR, and, therefore, will underestimate the capital income and the rate of return.

Alternative S2 imputes the average wage of wage earners as the wage of non wage-earners. Insofar as the income of non wage-earners is very different from such average wage, this measure of capital income will be biased.

In alternative S3 there is an attempt to measure the sensitivity of the rate of return to different constant labour shares in the mixed rents.

Rate of Return	
$\overline{X}_1$	0.0994
$\overline{X}_2$	0.1104
$\overline{X}_1 - \overline{X}_2$	-0.0110
Acceptance Region	(-0.0058 0.0058)

Table 8: Test for equality of means of the rate of return of capital

Figures 14 and 15 show the rates of return and the labour shares under the former hypotheses. The evolution of the rate of return and the shares of labour input in the total income do not differ too much in the different alternatives that have been considered. We can see that the rate of return decreases from the early 70's up to the early 80's, increases until the late 80's and falls again in the recession of the 90's. The labour share falls in the mid 70's up to the late 80's, when it increases to decrease again in the 90's.

As for the values of the rate of return according to hypothesis S1, the value is higher in all the periods than the one calculated according to hypothesis S2, unlike the labour share in the total rent. If we admit that hypothesis S1 underestimates the rate of return and overestimates the labour share, we must conclude that hypothesis S2 underestimates the capital income even more and also overestimates the labour share more.The labour income of non wage-earners should be quite inferior to the ones obtained from assigning the average wage of wage-earners to each non wage-earner. This is quite reasonable if we take into account that most agricultural work is not a salaried one and that the agricultural labour income is inferior to that in any other sector.

Stylized fact number 4 refers to a horizontal trend in the capital growth rate, so that the possibility of short-term fluctuations is not excluded. In figures 14.1 and 14.3 we can interpret that there is a horizontal trend in the average, but then we have to admit two great waves of about ten years as short-term fluctuations. On the other hand, labour shares seems to lack a horizontal trend.

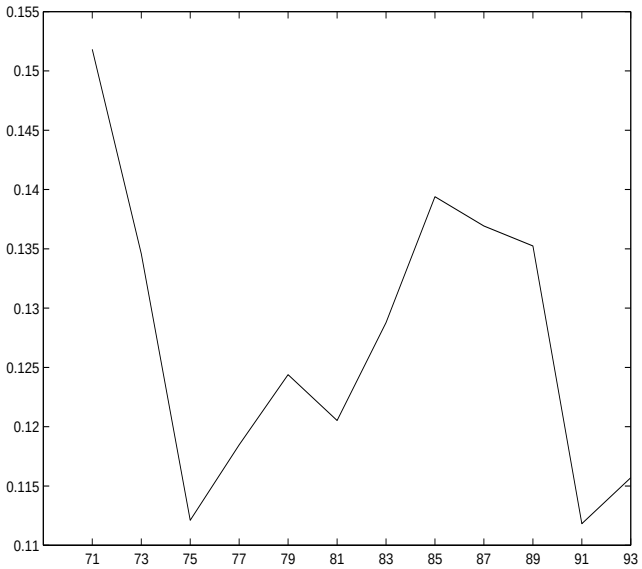
In former sections, changes in the averages of several ratios after 1986 have been reported. That is why it is interesting to check whether the same thing happens with the rate of return. Table 8 shows the results of the contrast, that reject the null hypothesis of equality between the previous and posterior averages to 1986.

On the other hand, the constancy of the factor shares in the aggregated income is usually used as an excuse to use the Cobb-Douglas production function in theoretical models. The observation that the labour share has a decreasing trend questions whether such production function is the right one to represent the technology in the Spanish economy. Indeed, in the presence of labour aumenting technical progress, the factor shares are constant for any production function with constant returns to scale.

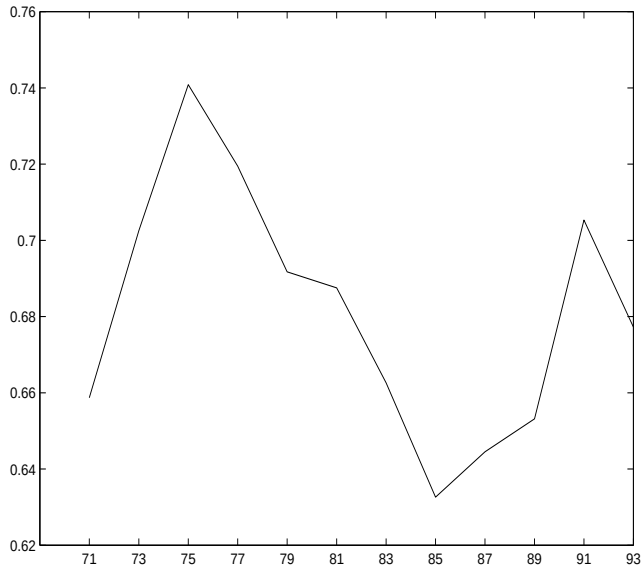
3.5.2 Rate of Return of Private Capital

NA considers that the public sector is just another productive sector, so that $\mathrm{GVA}_{\mathrm{cf}}$ includes a Gross Value Added to the factor cost of the public administrations ($\mathrm{GVA}^{g}_{\mathrm{cf}}$), that is, the $\mathrm{GVA}_{\mathrm{cf}}$ of the economy can be broken down in

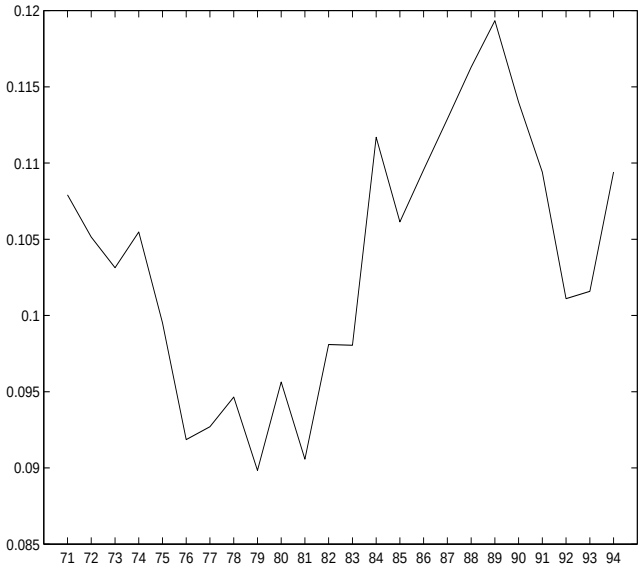
$$\mathrm{GVA}_{\mathrm{cf}} = \mathrm{GVA}^{b}_{\mathrm{cf}} + \mathrm{GVA}^{g}_{\mathrm{cf}}$$



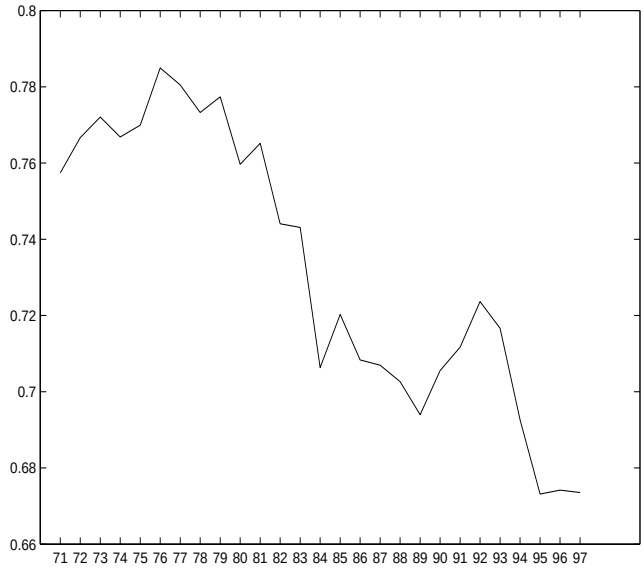
14.1: Rate of return calculated under assumption S1 (average 0.1275). Biyearly data.



14.2: Labour share calculated under assumption S1 (average 0.6814). Biyearly data.



14.3: Rate of return calculated under assumption S2 (average 0.103).



14.4: Labour share under assumption S2 (average 0.7322).

Figure 14: Source: NA and BBV.

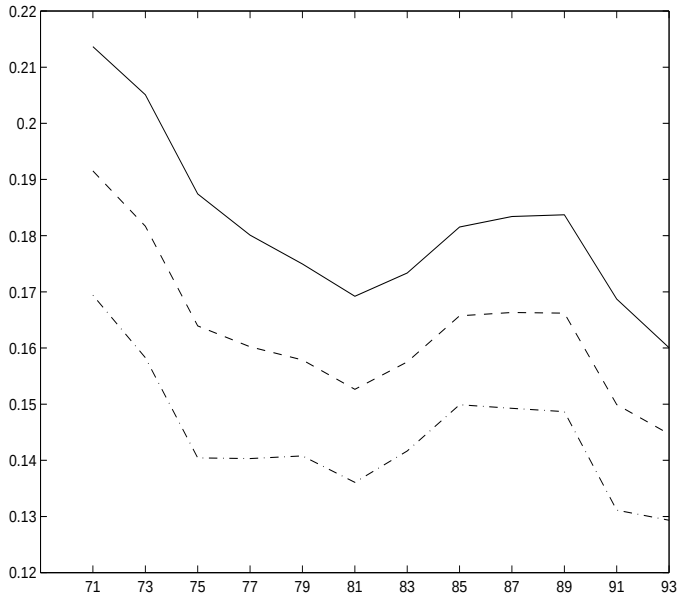


Figure 15: Rates of return calculated under assumption S3 for $(1-\alpha) = 0.1$, average 0.1818 $(-)$, $(1-\alpha) = 0.3$, average 0.1632 $(--)$ and $(1-\alpha) = 0.5$, average 0.1446 $(-\cdot)$.

where the b superindex refers to the private sector of the economy. Since there is no market price paid for the public sector services the added value of the public sector is valued ad hoc by means of the incurred cost in its production, that is,

$$\begin{aligned} &\mathrm{GVA}^g_{\mathrm{cf}} = \text{Public Capital Stock Depreciation} + \text{Public Wages} = \\ &= \mathrm{DEP}^g + \mathrm{WER}^g \end{aligned} \tag{8}$$

NA does not measure what in expression (8) would be the public capital income, that are somehow appropiated for the private sector of the economy. If this income was appropiated for the labour and capital factor in the same proportions that the income of each factor mean in the total income, we could obtain a measure of the private capital of the economy proceeding with the assumptions in the previous section.

- Under assumption S1

$$\text{Private Capital Income}_t = (\mathrm{GVA}_{\mathrm{cf}\,t} - \mathrm{GVA}^g_{\mathrm{cf}\,t}) - (\mathrm{WER}_t - \mathrm{WER}^g_t) - (1-\alpha_t)\,\mathrm{MR}_t \tag{9}$$

with

$$1 - \alpha_t = \frac{\mathrm{WER}_t - \mathrm{WER}^g_t}{\mathrm{GVA}_{\mathrm{cf}\,t} - \mathrm{GVA}^g_{\mathrm{cf}\,t} - \mathrm{MR}_t} \tag{10}$$

- Under assumption S2

$$\text{Private Capital Income}_t = (\mathrm{GVA}_{\mathrm{cf}\,t} - \mathrm{GVA}^g_{\mathrm{cf}\,t}) - \frac{\text{Employees}_t}{\text{wage-earners}_t}(\mathrm{WER}_t - \mathrm{WER}^g_t) \tag{11}$$

with

$$(1-\alpha_t) = \frac{\frac{\text{Employees}_t}{\text{wage-earners}_t}\,(\mathrm{WER}_t - \mathrm{WER}^g_t)}{\mathrm{GVA}_{\mathrm{cf}\,t} - \mathrm{GVA}^g_{\mathrm{cf}\,t}} \tag{12}$$

- Under assumption S3

$$\text{Private Capital Income}_t = (\text{GVA}_{\text{cf}\,t} - \text{GVA}^g_{\text{cf}\,t}) - (\text{WER}_t - \text{WER}^g_t) - (1-\alpha)\,\text{MR}_t \quad (13)$$

with $1-\alpha$ =0.1, 0.3, 0.5.

Figures 16 and 17 show the rates of return of private capital and the labour shares over the total income of the private sector calculated under these assumptions. If we discount the public sector the evolution of the rate of return of private capital and the labour share is not modified. However, the levels of those measures are affected: the rate of return of private capital, that is higher than the one calculated by considering the public wages and depreciation increases and the labour share decreases.

3.6 Average Productivity of Physical Capital

In section 3.3 stylized fact number 3 for the Spanish economy was discussed. In this section the inverse of the capital/output ratio is broken down by using the capital income series built in former sections. If we accept constant returns to scale and the factor remuneration to their marginal productivity, the average productivity of physical capital can be written as follows

$$\frac{Y_t}{K_t} = R_t + W_t \frac{H_t}{K_t}$$

so that, using the assumption S2, the Y/K average productivity can be broken down like this

$$\frac{\text{GVA}_{cf}}{\text{Capital Stock}} = R_t + \frac{\text{Labour Income}}{\text{Capital Stock}} = R_t + \frac{\dfrac{\text{Employee}}{\text{Wage-earners}}\,\text{WER}}{K}$$

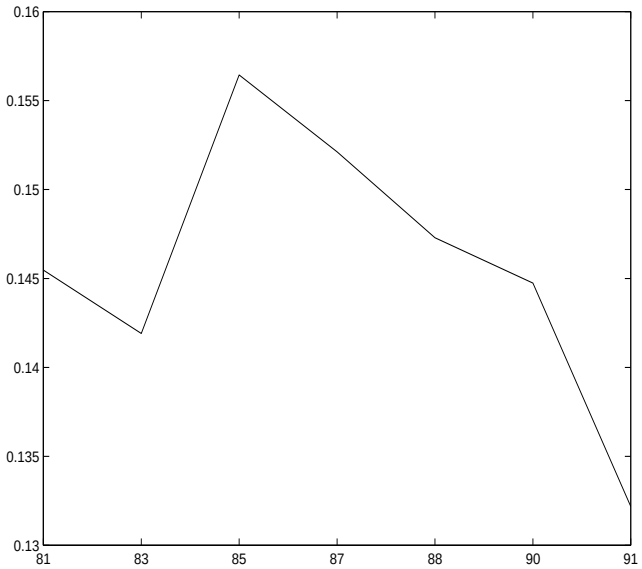
Figures 18 and 19 show the yearly and quarterly series of the average productivity and the addends they can be broken down into. The GVA at market price was used to obtain the quarterly series because there was no GVAcf complete quarterly series. Moreover, a series of quarterly capital stock and of labour share was calculated by interpolating the yearly series. In other words, it was assumed that the yearly capital stock corresponds to to the capital stock of the last quarter of each year. The other quarters were calculated by interpolation, using TRAMO (Gómez and Maravall, 1997), that deals with the values that are meant to be interpolated as missing observations of a series and uses the Kalman filter to build the missing value. This is a procedure to build a quarterly series, that is not economically justified, but that has the advantage of making sure that the quarterly series keeps the yearly series level that is the variable that is indeed measured. The same procedure was followed with the labour share.

On observing the measures of the physical capital income and of the labour shares, it seems clear that:

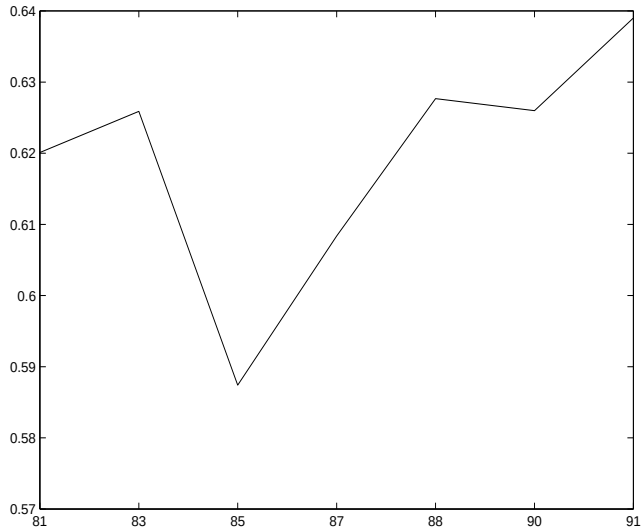
1.- The labour share is not constant in the 1970-1997 sample, but it has a decreasing trend with some fluctuations.

2.- The decreasing trend of the capital average productivity is not due to a fall in the capital stock rate of return, but rather to the evolution of labour market variables.

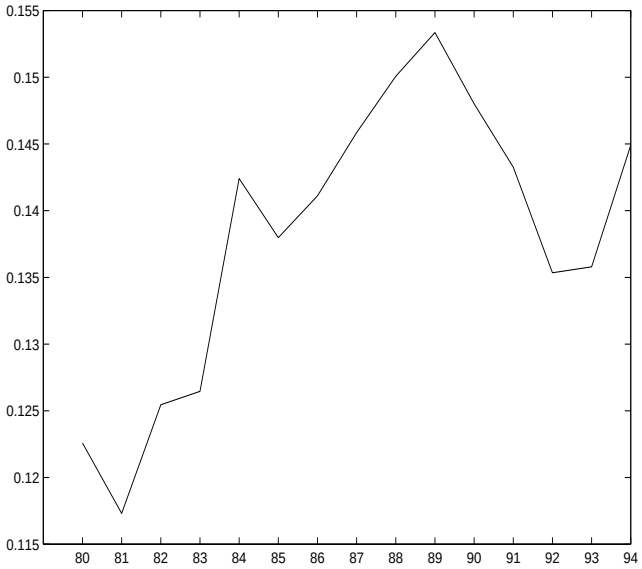
Observation 2 can be verified in figure 19 where the ratio of labour income over the physical capital stock presents a clearly decreasing trend with a very similar behaviour to the one the capital average productivity presents.



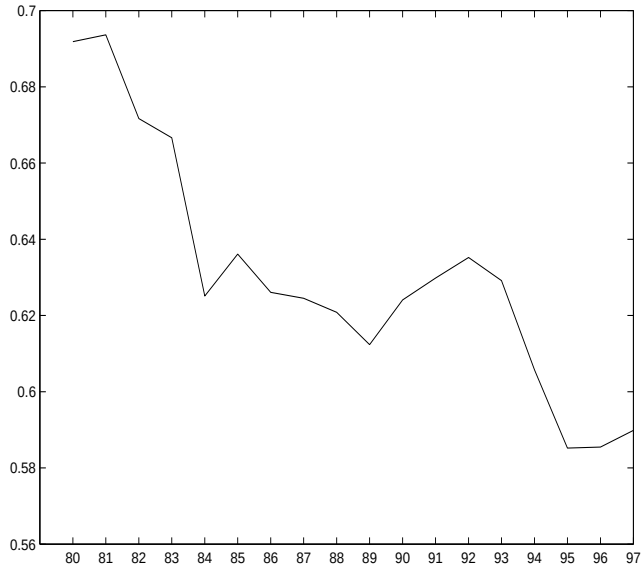
16.1: Rate of return on private capital calculated under assumption S1(average 0.1512).



16.2: . Labour share of the private sector calculated under assumption S1 (average 0.6173).



16.3: Rate of return on private capital calculated under assumption S2 (average 0.1380).



16.4: Labour share of the private sector calculated under assumption S2 (average 0.6307).

Figure 16: Source: NA and BBV.

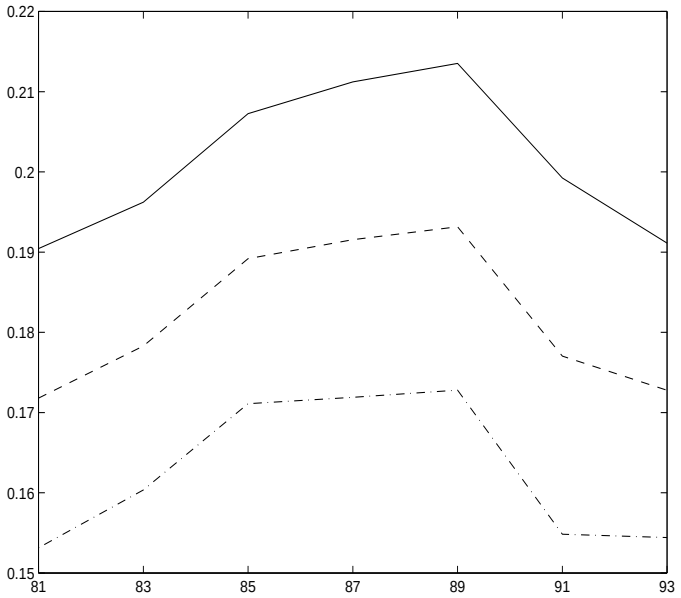
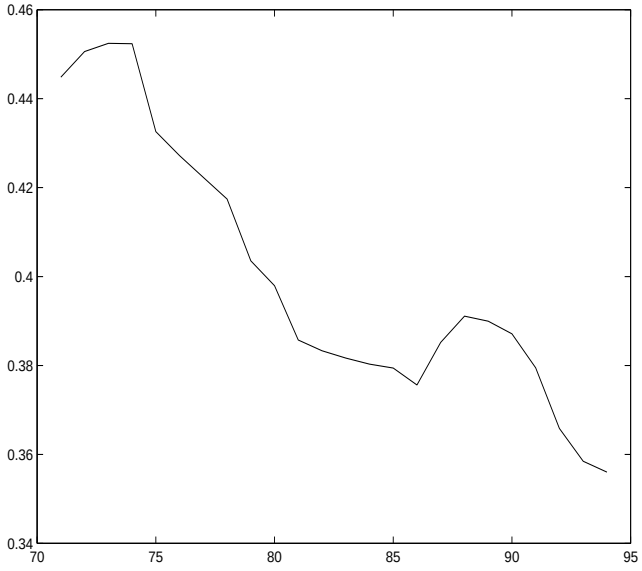
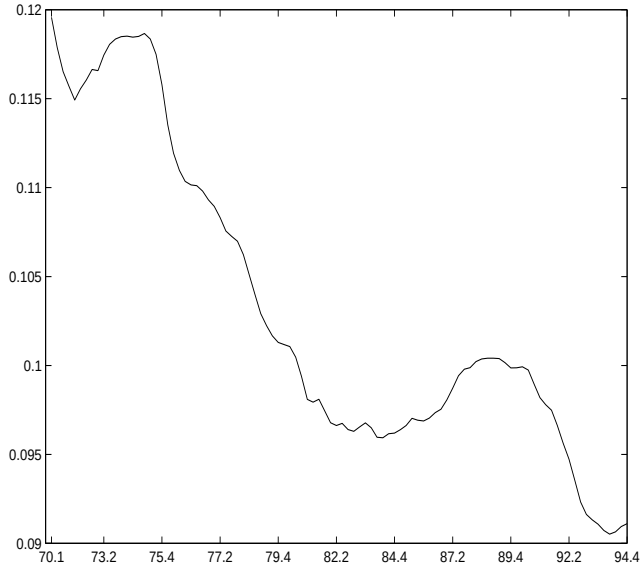


Figure 17: Rates of return on private capital calculated under assumption S3 for $(1-\alpha) = 0.1$, average 0.2013 $(-)$, $(1-\alpha) = 0.3$, average 0.1820 $(--)$ and $(1-\alpha) = 0.5$, average 0.1627 $(-\cdot)$.

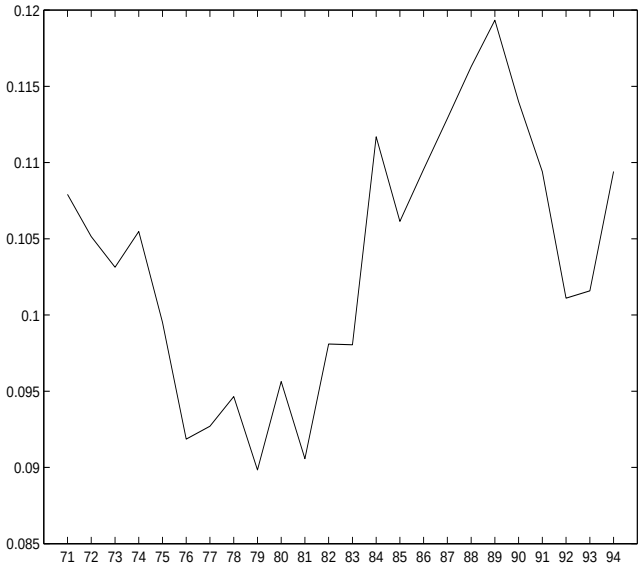


18.1: GVA_{cf}/Capital Stock ratio. Yearly series.

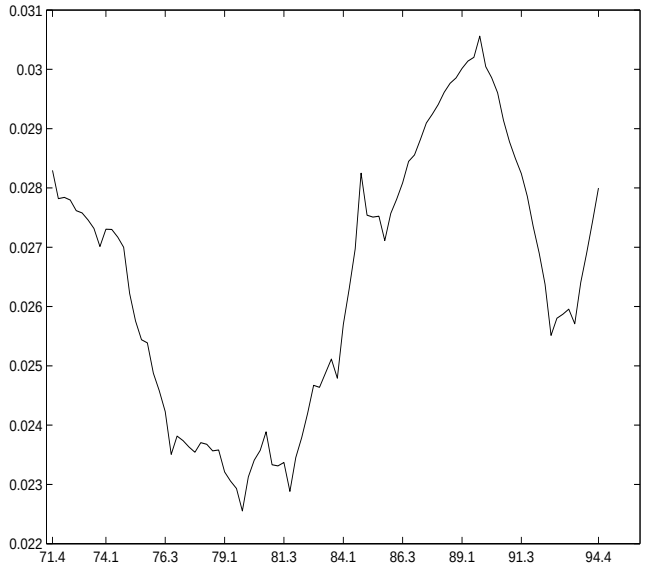


18.2: GVA_{pm}/Capital Stock ratio. Quarterly series.

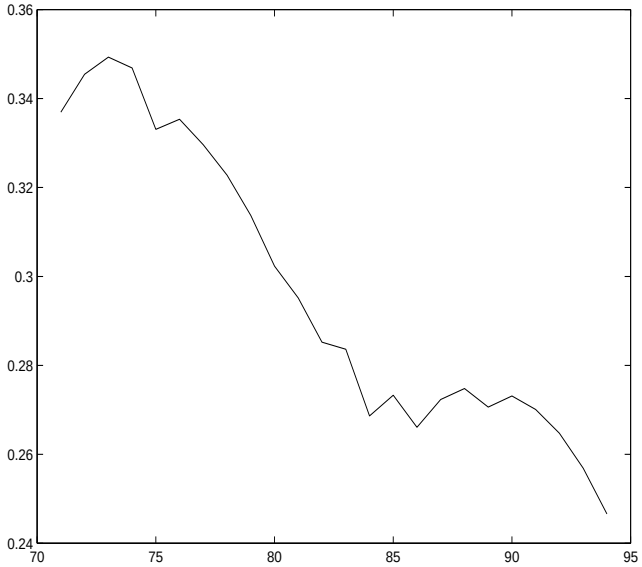
Figure 18: Source: NA, BBV and own computations.



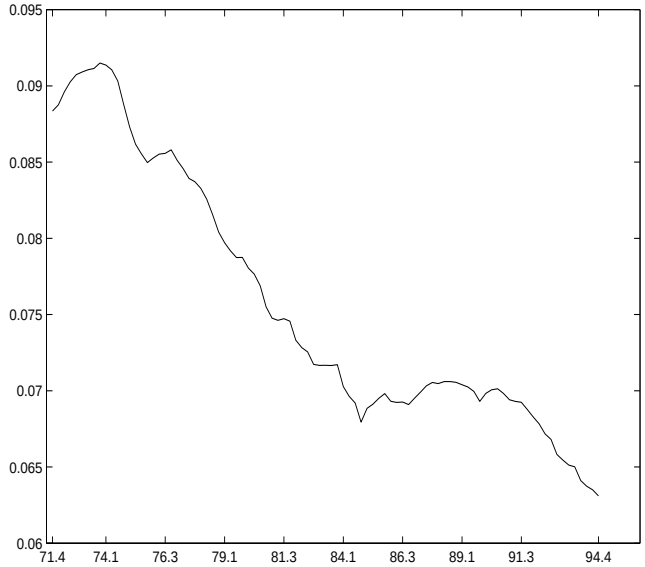
19.1: Rate of return. Yearly series.



19.2: Rate of return. Quarterly series.



19.3: Labour income/physical capital stock ratio. Yearly series.



19.4: Labour income/physical capital stock ratio. Quarterly series.

Figure 19: Source: NA, BBV and own computations.

Caballero and Hammour (1997) report, for the French economy, a similar behaviour of the Y/K ratio and of the labour share in the rent to the one shown here for the Spanish economy. These authors base their argumentation on two technological characteristics: technical progress incorporated in the capital that makes the capital be less elastic in short-term than in long-term and the substituibility between labour and capital that induces the substitution of labour for capital in the long-term when the labour factor appropriates the capital rents in short-term. Thus, they state that the institutional changes of the 70's contributed to the labour factor apropiation of rents in a moment in which, from the viewpoint of efficiency, the depressive condition of those years suggested institutional changes and wage adjustments to the capital factor. This would explain the increase of the labour share in the rent in the 60's. But these changes in the relationships between capital and labour caused that the agents preferred more intensive technologies in capital factor in long-term. This is the way they explain the fall of the Y/K ratio and of the labour share in the rent that happen after the 70's. If this or other explanations are appropriate for the Spanish economy, it requires deeper research that goes beyond our task in the present study.

3.7 Conclusion

Summarizing, we can get some conclusions about measures associated to the so-called "stylized facts of growth " for the Spanish economy.

1.- There is evidence of a change in the growth rate, both of the real output per employee and for the real output per hour worked, that would happen in the mid 80's.

2.- The capital/hours worked ratio also shows a change in its growth rate that happens in the mid 80's.

3.- The output/capital ratio shows a clearly decreasing trend until the 80's, and then it shows cyclical fluctuations.

4.- The rate of return shows a behaviour that suggests a horizontal trend with great fluctuations. We can also see a change in its average value after 1986.

5.- The labour share does not seem to have a stationary behaviour, falling until the 80's and showing fluctuations after that.

6.- There is no evidence that the growth rates of TFP, output per hour worked and capital per hour worked are equal in any of the subsamples.

These observations are clear evidence that in the Spanish economy there is a change in the long-term behaviour-determining factors of the economy in the mid 80's. On the other hand, the decreasing trends of the labour share in the rent and the output/capital ratio as well as the lack of equality among the growth rates of TFP, output per hour worked and capital per hour worked are evidence against the aptitude of the neoclassical growth model to explain the long-term behaviour of the economy in the sample studied.

4 Balanced Growth and Neoclassical Model

An economy that experiences a balanced growth has other characteristics, besides the "stylized facts of growth". The neoclassical growth model in the determinist version developed by Cass (1965) and Koopmans (1965), presents balanced growth-paths for the variables of the

economy. Thus, the neoclassical growth model can be used to highlight the characteristics of an economy that experiences a balanced growth.

A neoclassical growth model with infinite life agents is an economy that consists of a large number of identical families that live in an infinite number of periods with defined preferences over consumption and leisure. It is assumed that we can model all the families as a representative family and that their preferences are additively separable as follows

$$U = \sum_{t=0}^{\infty} \tilde{\delta}^t u\left(C_t, O_t\right)$$

The utility function of each period $u : \mathcal{R}_+^2 \to \mathcal{R}$ is continuously differentiable in its arguments, increasing, strictly concave and satisfies the Inada conditions.

The representative family is the owner of all the capital and labour of the economy they hire out to the firms to produce the only perishable good of the economy. This can become consumption product or investment good with no cost. The size of the representative family (N_t) increases according to

$$N_{t+1} = (1+n)N_t$$

On assuming that there are constant returns to scale and that all the firms have the same technology, we can consider a representative firm by means of the following neoclassical production function with labour aumenting technical progress

$$\begin{aligned} Y_t &= F(K_t, A_t L_t) \\ A_{t+1} &= (1+\gamma)A_t \end{aligned}$$

where A_t represents technical progress, L_t the hours worked, K_t the capital factor and F satisfies the Inada conditions. If we transform the variables into efficient units such as $x_t = X_t/A_t N_t$, we can express

$$\begin{aligned} y_t &= F(k_t, l_t) \\ U &= \sum_{t=0}^{\infty} \delta^t u(c_t, 1-l_t) \end{aligned}$$

where l_t represents the hours worked by each member of the family. The former transformation usually changes the discount factor of utility function, that has to verify $0 < \delta < 1$.

Assuming that the capital stock is depreciated at a constant rate $0 < \mu \leq 1$, this evolves according to the expression

$$K_{t+1} = I_t + (1-\mu)K_t$$

where I_t represents the investment per efficient unit

$$(1+n)(1+\gamma)k_{t+1} = (1-\delta)k_t + i_t$$

In this economy, we can characterize the competitive equilibrium allocation by solving the problem of the social planner. The problem of the planner for this economy is

$$\begin{aligned} \max_{\{c_t\}_{t=0}^{\infty}, \{l_t\}_{t=0}^{\infty}, \{i_t\}_{t=0}^{\infty}, \{k_t\}_{t=1}^{\infty}} \quad & \sum_{t=0}^{\infty} \delta^t u(c_t, 1-l_t) \\ s.t \quad & \\ & c_t + i_t = F(k_t, l_t) \\ & (1+\gamma)(1+n)k_{t+1} = (1-\mu)k_t + i_t \\ & k_0 \text{ given.} \end{aligned} \tag{14}$$

The FOC of the planner problem are

$$
\begin{aligned}
-\frac{u_l(c_t, 1-l_t)}{u_c(c_t, 1-l_t)} &= F_l(k_t, l_t) \\
\frac{u_c(c_t, 1-l_t)}{\delta u_c(c_{t+1}, 1-l_{t+1})} &= \frac{F_k(k_{t+1}, l_{t+1}) + (1-\mu)}{(1+\gamma)(1+n)} \\
c_t &= F(k_t, l_t) - (1+\gamma)(1+n)k_{t+1} + (1-\mu)k_t
\end{aligned}
$$

A steady state of this economy is a competitive equilibrium in which all the quantities, c^*, i^*, l^*, k^* are constant, that is, c^*, i^*, l^*, k^* satisfy

$$
\begin{aligned}
-\frac{u_l(c^*, 1-l^*)}{u_c(c^*, 1-l^*)} &= F_l(k^*, l^*) \\
\frac{(1+\gamma)(1+n)}{\delta} &= 1 + F_k(k^*, l^*) - \mu \\
c^* &= F(k^*, l^*) - (\gamma + n + \gamma n + \mu)k^*
\end{aligned}
\tag{15}
$$

where $y^* = F(k^*, l^*)$ is the real output per efficient labour unit that is constant in steady state. This means that Y_t/N_t in steady state is growing at the same γ rate as A_t. On the other hand, k^* is the capital stock per efficient labour unit that is also constant in steady state, so K_t/N_t grows at the constant γ rate. The capital/output ratio is also constant because $k^*/y^* = K_t/Y_t$. Similarly; we can obtain that the C_t/Y_t and I_t/Y_t ratios are constant in steady state.

It is trivial to check that the prices for which the allocations that solve the problem of the planner are a competitive equilibrium, are

$$
\begin{aligned}
w_t &= F_l(k_t, l_t) \\
r_t &= F_k(k_t, l_t)
\end{aligned}
$$

where w_t is the wage per efficient labour unit and r_t is the rate of return, so that, in steady state, the rate of return and the wage per efficient labour unit are constant. Then, the wage per labour unit will grow at the constant γ rate. The labour supply per capita, l^*, is also constant in steady state.

Thus, the economy in the balanced growth path has the following characteristics:

1.- The output per employee Y_t/N_t and the output per hour worked Y_t/l^*N_t grow at the γ constant rate.

2.- The capital stock per employee K_t/N_t and the capital stock per hour worked K_t/l^*N_t grow at the γ constant rate.

3.- The ratio between the capital stock and the output K_t/Y_t keeps constant.

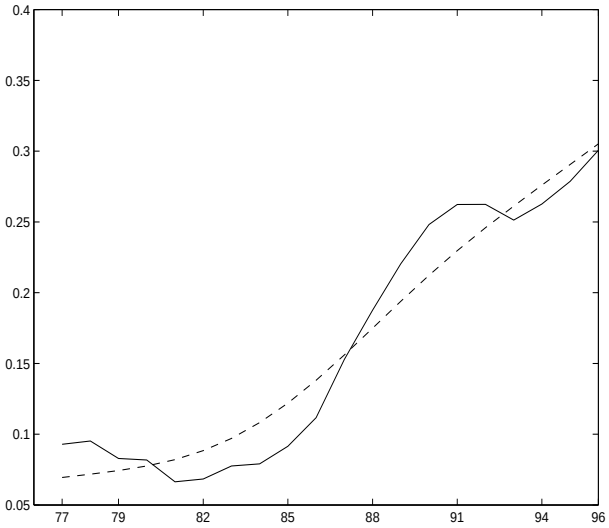
4.- The rate of return r_t is constant.

5.- The consumption and investment shares in the output C_t/Y_t and I_t/Y_t are constant.

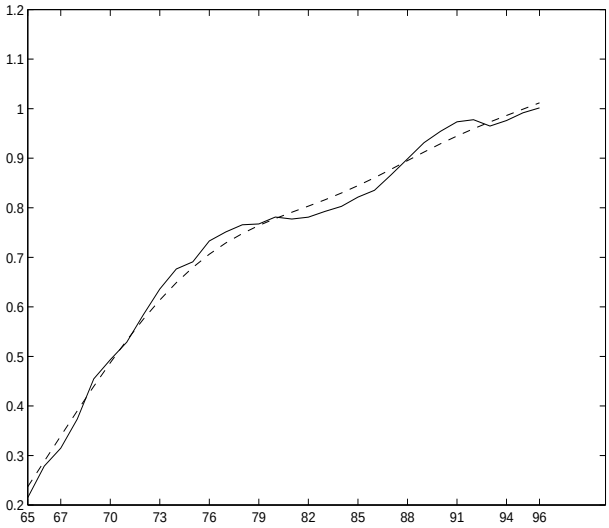
6.- The individual labour effort l_t has to be constant.

7.- The wage per hour worked grows at the γ constant rate.

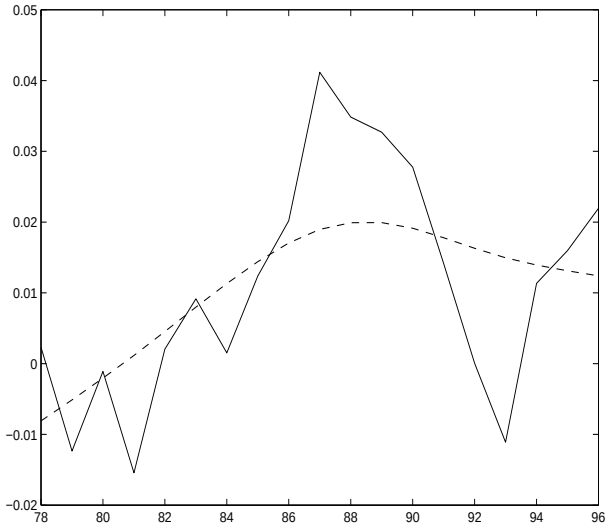
Characteristics 1, 2, 3 and 4 are closely related to the so-called "stylized facts of growth", and that is why this model reproduces such "stylized facts" qualitatively. Since the "stylized facts of growth" have been discussed in former sections, we will not deal with them now. The next section focus on predictions 5, 6, and 7 for the Spanish economy.



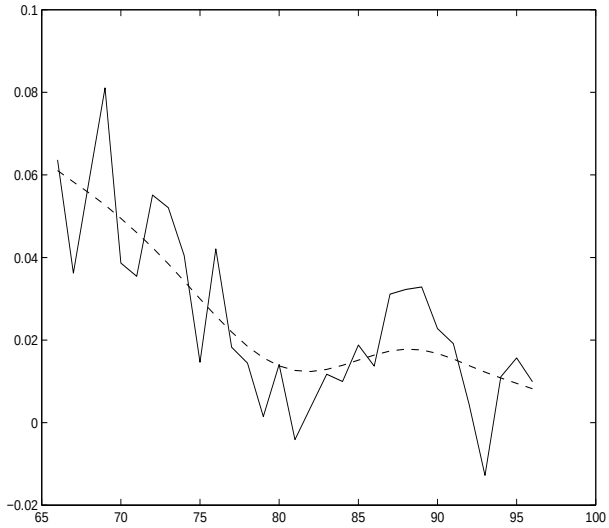
20.1: Output per capita.



20.2: Output per labour force unit.

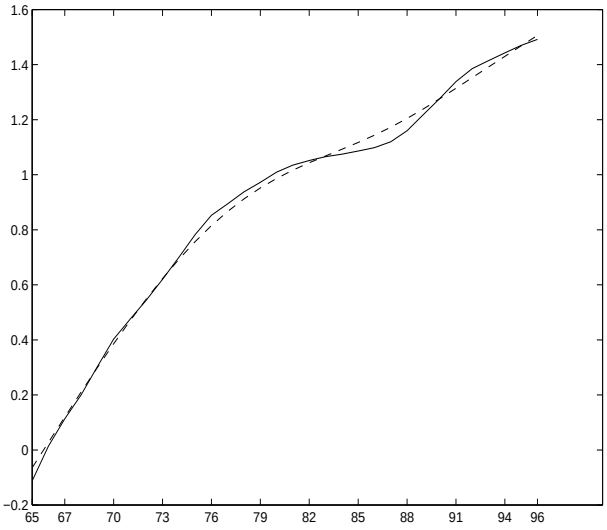


20.3: Growth rate of the output per capita.

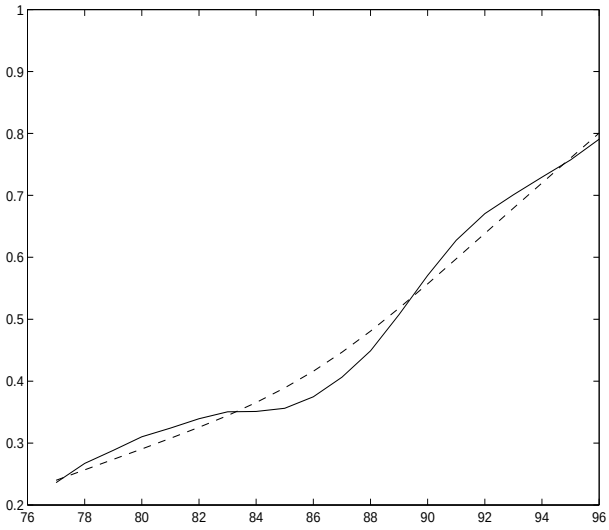


20.4: Growth rate of the output per labour force unit.

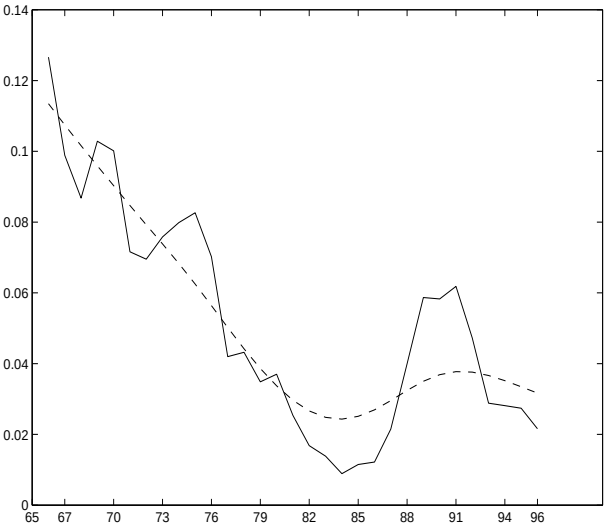
Figure 20: Logarithms of the output per capita, per labour force unit and their growth rates. The trends were obtained by means of the H-P filter $\lambda = 100$. Source: INE.



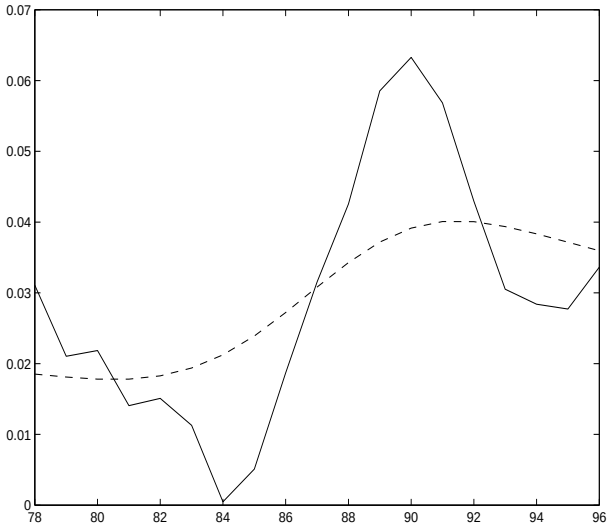
21.1: Capital over labour force.



21.2: Capital per capita.

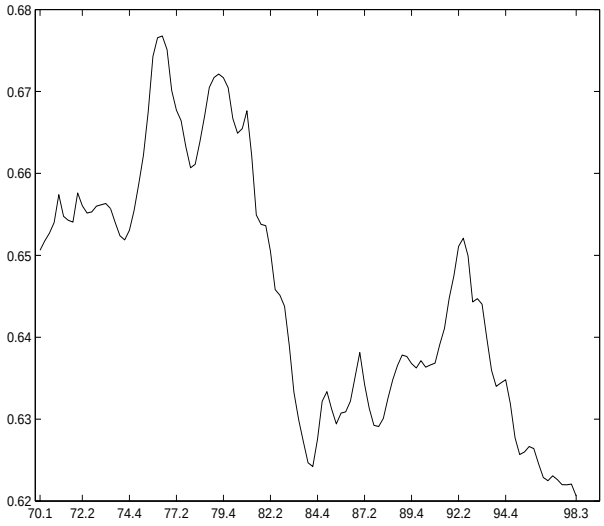


21.3: Growth rate of the capital over labour force.

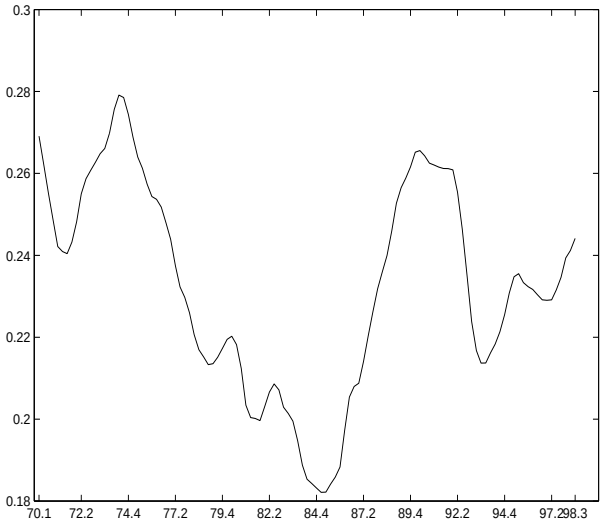


21.4: Growth rate of the capital per capita.

Figure 21: Logarithms of capital per capita, per labour force and their growth rates, The trends were obtained by means of the H-P filter $\lambda = 100$. Source: INE and BBV.



22.1: Private consumption over output. 1970.1-1998.3.



22.2: Investment over output. 1970.1-1998.3.

Figure 22: Private consumption and investment over output. Source: INE.

4.0.1 C_t/Y_t and I_t/Y_t ratios

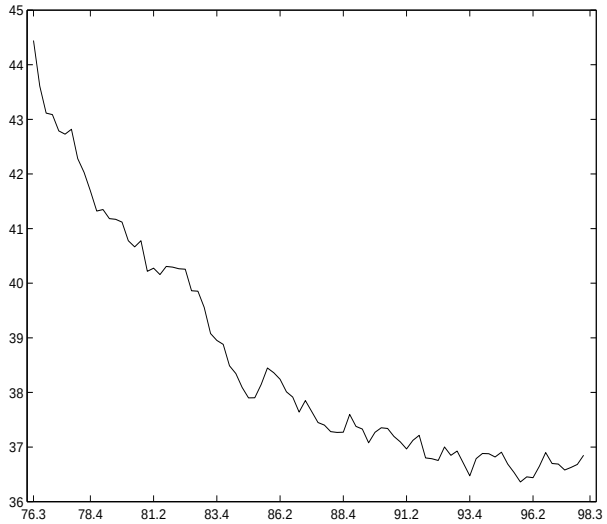
The shares of consumption and investment in output are shown in figure 22. The evolution of both ratios suggests that there is some demand component that has not been included and that has been increasingly important since the late 70's. Both ratios have a heavy fall from the late 70's to the mid 80's and then both grow again until the early 90's. According to equation (14), if one of the shares increases, the other one has to decrease, so that something remains outside the model. The best candidates to be outside the model are the public expenditure and the trade balance.

On the other hand, figure 22 suggests that there can be changes in the ratio average after the mid 80's. Tables 9 and 10 show the tests of average equality for the subsamples 1970.1-1985.4 and 1986.1-1998.3. These subsamples are chosen in view of the evidence found in the section dedicated to the "stylized facts".

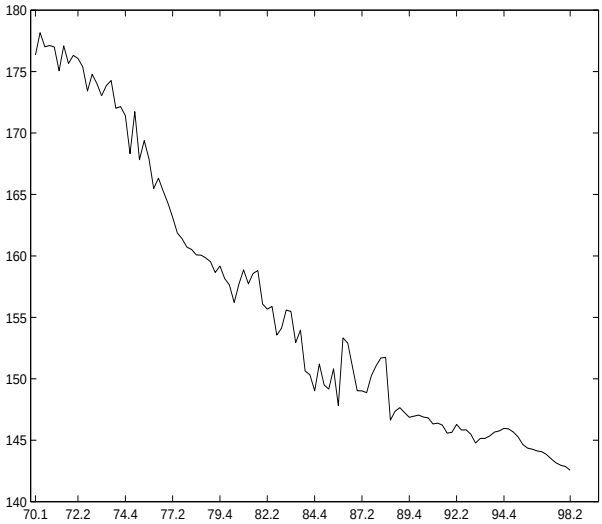
In the case of the consumption/output ratio the average equality in each subsample is rejected, whereas in the case of the investment/output ratio the average equality cannot be rejected.

4.0.2 Individual Labour Supply

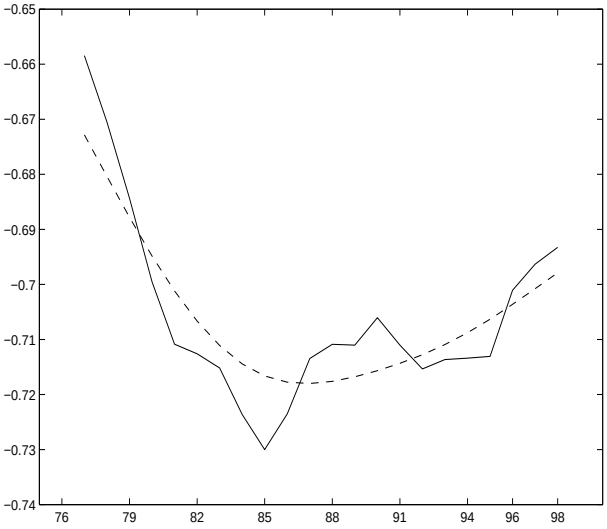
Both the average hours worked per week by the employees and the average hours worked per month by the wage-earners of the industry and services are studied as a measure of the individual labour supply. Figure 23 shows these two series for the Spanish economy. Both present a clear decreasing trend, though the average hours worked by the employees suggests some stability from the second half of the 80's onwards.



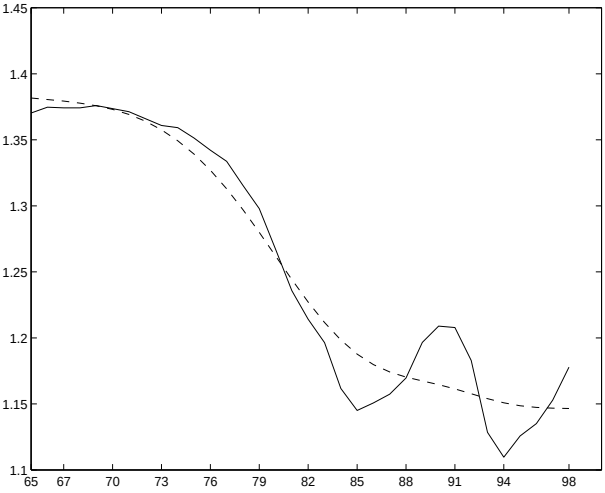
23.1: Average hours worked per week by employees.



23.2: Average hours worked per month by wage-earners.



23.3: Activity rate.



23.4: Employment rate.

Figure 23: Data in logarithms. The trends were obtained by means of the H-P filter $\lambda = 100$ (yearly ones) and $\lambda = 1600$ (quarterly ones)

C_t/Y_t **ratio**	
$\overline{X}_1$	0.6550
$\overline{X}_2$	0.6338
$\overline{X}_1 - \overline{X}_2$	0.0212
Acceptance Region	(-0.0043 0.0043)

Table 9: Test for equality of means for the consumption/output ratio. The subindexes refer to the subsamples.

I_t/Y_t **ratio**	
$\overline{X}_1$	0.2298
$\overline{X}_2$	0.2355
$\overline{X}_1 - \overline{X}_2$	-0.0057
Acceptance Region	(-0.0095 0.0095)

Table 10: Test for equality of means for the investment/output ratio. The subindexes refer to the subsamples.

4.0.3 Real Wage per Hour Worked

The labour share of (6) is used to obtain a measure of the real wage per hour worked, so that

$$W_t = \frac{(1-\alpha_t)\text{GDP}_t}{\text{Hours worked by employees}} \tag{16}$$

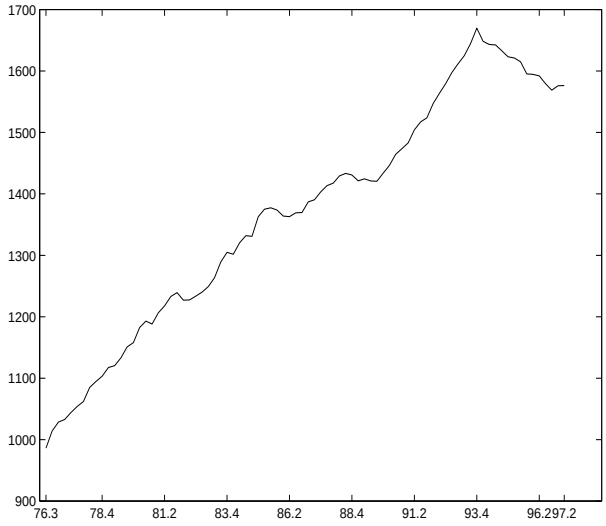
where the total hours worked per quarter by the employees is calculated as follows 12×number of employees×average hours worked per week by employees. The real wage per hour worked and its growth rate are presented in figure 24. In the real wage we can observe a fall since 1994 that breaks the increasing trend observed since the mid 70's.

Figure 24 suggests a change in the average of the growth rate of the real wage per hour in the second half of the 80's, like what happened in the output per employee and per hour worked series or the capital stock per hour worked one. Table 11 presents the corresponding test of average equality for the previous and posterior samples to 1986, that rejects the hypothesis of average equality.

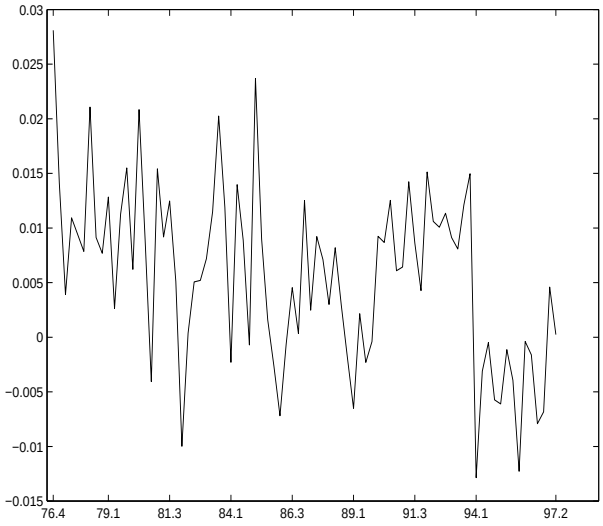
The model predicts that the real wage per hour worked grows at the same rate as TFP,

Real wage per hour worked	
$\overline{X}_1$	0.0090
$\overline{X}_2$	0.0030
$\overline{X}_1 - \overline{X}_2$	0.0060
Acceptance Region	(-0.0034 0.0034)

Table 11: Test for equality of means of the growth rate of the wage per hour worked.



24.1: Real wage per hour worked.



24.2: Growth rate of the real wage per hour worked.

Figure 24: Real wage per hour worked and its growth rate. Pesetas of 1990. Source: INE and own computations

	ΔTFP	**ΔGDP/Hours**	**ΔCapital/Hours**	**ΔReal Wage**
Average$(\overline{x}_i)$	0.0081	0.0116	0.0145	0.0090
Standard Deviation (σ_i)	0.0055	0.0070	0.0079	0.0080
F	5.9634			
Acceptance Region	$F < 3.0781$			

Table 12: Test for equality of means for the growth rates of TFP, GDP/hours worked, capital/hours worked and wage per hour. sample: 1976.4-1985.4.

the output per hour and the capital/hour worked ratio. Thus, the test of average equality of the variables of figures 9.4, 10.2, 12.1 and 24.2 for subsamples 1976.4-1985.4 and 1986.1-1994.4 is computed. In this case, the equality of the growth rate averages is rejected for the first subsample, but it cannot be rejected for the 1986.1-1994.4 sample.

In the following sections the existence of a government and a foreign sector is included in the model with the purpose of illustrating the forecast of the model over the behaviour of the public expenditure and the trade balance

4.1 Balanced Growth and Neoclassical Model with Government

If we want to include the government in the neoclassical growth model, we have to add to the families an agent that finances their expenditures by means of a tax collection on consumption and income, and the real bond issue that sells to families at the q price. It is

	ΔTFP	**ΔGDP/Hours**	**ΔCapital/Hours**	**ΔReal Wage**
Average $(\overline{x}_i)$	0.0039	0.0061	0.0076	0.0048
Standard Deviation (σ_i)	0.0037	0.0046	0.0074	0.0069
F	2.7215			
Acceptance Region	$F < 3.0804$			

Table 13: Test for equality of means for the growth rates of TFP, GDP/hours worked and capital/hours worked. sample: 1986.1-1994.4.

assumed that the bonds expire after one period and the amount per capita of the goods of the t period paid for the bonds bought in t-1 is denoted by b_t. The return of those bonds is $1/q_t$. With these resources the government spends in consuming the only good of the economy. Although there are models where the public expenditure affects the welfare of individuals, in this case the only purpose of the government is to consume. Since, in this section, we are not interested in how the government decides on the consumed amount of goods, the taxes and the amount of bonds to be issued, it is not necessary to state all these decisions that are considered exogenous.

In this situation, the solution for the problem of the planner does not characterize the competitive equilibrium of the economy because there are distorting taxes.

A general competitive equilibrium for this economy is a set of quantity sequences $\{c_t,\ i_t,\ l_t,\ y_t,\ g_t\}_{t=0}^{\infty},\ \{k_t$ and prices $\{w_t,\ r_t$ and $q_t\}_{t=0}^{\infty}$, along with values for the taxes $\tau_c,\ \tau_y$, such that

1.- Given $k_0 > 0,\ b_0 > 0,\ \{g_t,\ w_t,\ r_t$ y $q_t\}_{t=0}^{\infty}$, the sequences $\{c_t\}_{t=0}^{\infty},\ \{l_t\}_{t=0}^{\infty},\ \{i_t\}_{t=0}^{\infty}$, $\{k_t\}_{t=1}^{\infty}$ and $\{b_t\}_{t=1}^{\infty}$ solve

$$\begin{aligned} \max \quad & \sum_{t=0}^{\infty} \delta^t u(c_t, 1-l_t) \\ s.t \quad & \\ & (1+\tau_c)c_t + i_t + q_t(1+n)(1+\gamma)b_{t+1} = (1-\tau_y)[w_t l_t + r_t k_t] + b_t \quad (17) \\ & (1+\gamma)(1+n)k_{t+1} = (1-\mu)k_t + i_t \end{aligned}$$

the equation (17) is the budget constraint of the family, where the right hand side represents the wage income plus the capital income after taxes, plus the return obtained from the government bonds.

2.- In each t moment the budget constraint of the government is satisfied as

$$g_t + b_t = \tau_c c_t + \tau_y[w_t l_t + r_t k_t] + q_t(1+\gamma)(1+n)b_{t+1}$$

where g_t represents the consumption of the government.

3.- In each t moment, given w_t and r_t, y_t, k_t and l_t values solve the problem of the representative firms

$$F_l(k_t, l_t) = w_t \ \text{ and } \ F_k(k_t, l_t) = r_t$$

4.- In each t moment the market good is cleared

$$y_t = c_t + i_t + g_t \quad (18)$$

So the competitive equilibrium can be summarized in the following equations

$$
\begin{aligned}
&-\frac{u_c(c_t, 1-l_t)}{u_l(c_t, 1-l_t)} = \frac{(1+\tau_c)}{(1-\tau_y)F_l(k_t, l_t)} \\
&\frac{u_c(c_t, 1-l_t)}{\delta u_c(c_{t+1}, 1-l_{t+1})} = \frac{(1-\tau_y)F_k(k_{t+1}, l_{t+1}) + (1-\mu)}{(1+\gamma)(1+n)} \\
&q_t = \frac{\delta u_c(c_{t+1}, 1-l_{t+1})}{(1+\gamma)(1+n)u_c(c_t, 1-l_t)} \\
&q_t(1+\gamma)(1+n)b_{t+1} - b_t = (1+\tau_c)g_t + \tau_c[(1+\gamma)(1+n)k_{t+1} - (1-\mu)k_t] - \\
&-(\tau_c + \tau_y)F(k_t, l_t) \qquad (19) \\
&c_t = F(k_t, l_t) - (1+\gamma)(1+n)k_{t+1} + (1-\mu)k_t - g_t
\end{aligned}
$$

The government determines the tax rates, τ_c and τ_y, and the expenditure in each period, g_t, which determines its borrowing with equation (19). The bond price and the capital return have to coincide by arbitrage. The steady state of this economy is characterized by the equations

$$
\begin{aligned}
&-\frac{u_c(c^*, 1-l^*)}{u_l(c^*, 1-l^*)} = \frac{(1+\tau_c)}{(1-\tau_y)F_l(k^*, l^*)} \\
&\frac{(1+\gamma)(1+n)}{\delta} = 1 + (1-\tau_y)F_k(k^*, l^*) - \mu \\
&q^* = \frac{\delta}{(1+\gamma)(1+n)} \\
&b^* = \frac{(1+\tau_c)g^* + \tau_c(\gamma + n + \gamma n + \mu)k^* - (\tau_c + \tau_y)F(k^*, l^*)}{q^*(1+\gamma)(1+n) - 1} \\
&c^* = F(k^*, l^*) - (\gamma + n + \gamma n + \mu)k^* - g^*
\end{aligned}
$$

The interpretation of the variables only changes for G_t, that is interpreted as the level of public consumption, and B_t that will be the level of capacity or need of government financing.

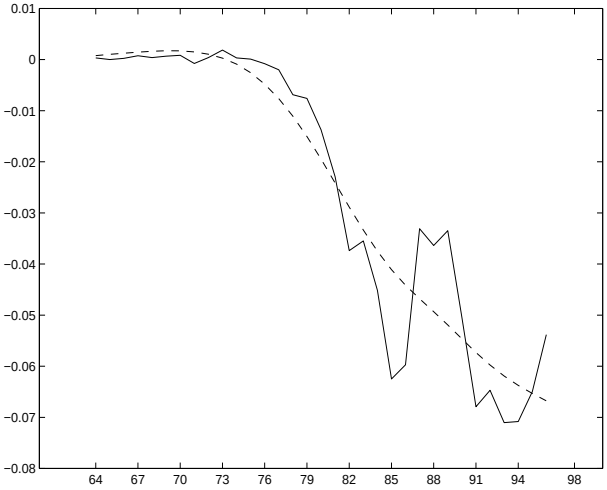
In this case, the balanced growth path of the economy shows the same characteristics as in the case without government adding that the public expenditure/output and the need of government financing/output ratios are constants.

The public expenditure/output and the need of government financing/output ratios for the Spanish economy are shown in figure 25. In it, we can observe a clearly increasing trend in the public expenditure share of the output, that keeps growing from the mid 70's to the early 90's. At the same time, we can see a strong increase in the financing needs of the government from the mid 70's to the mid 80's, that imply a strong growth of the public deficit, though it seems to level off at the end of the sample coinciding with a fall of the public expenditure/output ratio.

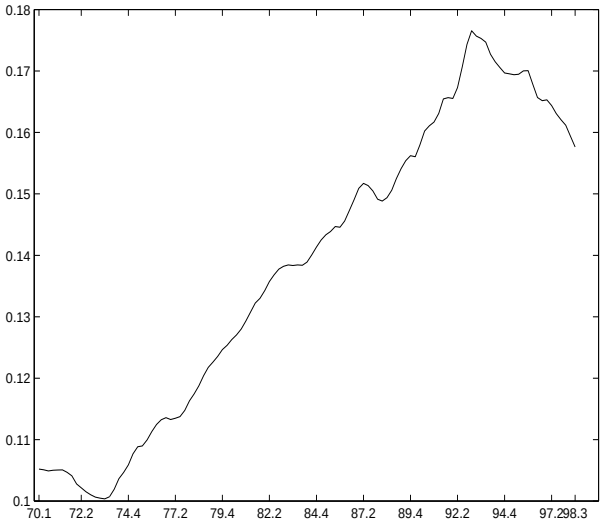
4.2 Balanced Growth and Neoclassical Model with Government and Foreign Sector

In order to include the foreign sector, it is assumed that any family of this economy has access to a perfectly competitive international capital market in which it is possible to buy and sell foreign real bonds, BE_t, at an exogenous price, p_t. Thus, the amount of foreign bonds kept evolves according to

$$p_t BE_{t+1} = TB_t + BE_t$$



25.1: Capacity-financing need of the government over GDP.



25.2: Public expenditure over GDP.

Figure 25: Public expenditure and capacity-financing need of the government over output.

where TB_t is the trade balance. The fact that p_t is exogenous expresses that it is about a small economy, so that the accumulation path of foreign assets has no impact on p_t.

A competitive general equilibrium for this economy is a set of quantitative sequences $\{c_t,\ i_t,\ l_t,\ y_t\}_{t=1}^{\infty}$, $\{k_t,\ g_t,\ b_t,\ tb_t\}_{t=1}^{\infty}$ and prices $\{w_t,\ r_t,\ p_t,\ q_t\}_{t=0}^{\infty}$, along with values for $\tau_c,\ \tau_y$ taxes such that

1.- Given $k_0 > 0$, $b_0 > 0$, $tb_0 > 0$, $\{g_t,\ w_t,\ r_t,\ p_t$ y $q_t\}_{t=1}^{\infty}$, the sequences $\{c_t\}_{t=0}^{\infty}$, $\{l_t\}_{t=0}^{\infty}$, $\{i_t\}_{t=0}^{\infty}$, $\{k_t\}_{t=1}^{\infty}$, $\{tb_t\}_{t=1}^{\infty}$ and $\{b_t\}_{t=1}^{\infty}$ solve

$$\max \quad \sum_{t=0}^{\infty} \delta^t u(c_t, 1-l_t)$$

$$s.t$$

$$(1+\tau_c)c_t + i_t + q_t(1+n)(1+\gamma)b_{t+1} + p_t(1+n)(1+\gamma)be_{t+1} =$$
$$= (1-\tau_y)[w_t l_t + r_t k_t] + b_t + be_t$$
$$(1+\gamma)(1+n)k_{t+1} = (1-\mu)k_t + i_t$$

2.- In each t moment the budget constraint of the government is satisfied as follows

$$g_t + b_t = \tau_c c_t + \tau_y[w_t l_t + r_t k_t] + q_t(1+\gamma)(1+n)b_{t+1}$$

3.- In each t moment, given w_t and r_t, y_t, k_t and l_t values solve the problem of the representative firm

$$F_l(k_t, l_t) = w_t \ \text{ and } \ F_k(k_t, l_t) = r_t$$

4.- In each t moment, the good market is cleared

$$y_t = c_t + i_t + g_t + tb_t \tag{20}$$

The equations that determine the competitive equilibrium are

$$
\begin{aligned}
&-\frac{u_c(c_t, 1-l_t)}{u_l(c_t, 1-l_t)} = \frac{(1+\tau_c)}{(1-\tau_y)F_l(k_t, l_t)} \\
&\frac{u_c(c_t, 1-l_t)}{\delta u_c(c_{t+1}, 1-l_{t+1})} = \frac{(1-\tau_y)F_k(k_{t+1}, l_{t+1}) + (1-\mu)}{(1+\gamma)(1+n)} \\
&p_t = q_t = \frac{\delta u_c(c_{t+1}, 1-l_{t+1})}{(1+\gamma)(1+n)u_c(c_t, 1-l_t)} \\
&p_t(1+\gamma)(1+n)b_{t+1} - b_t = g_t - \tau_c c_t - \tau_y F(k_t, l_t) \qquad (21) \\
&tb_t = p_t(1+\gamma)(1+n)be_{t+1} - be_t = \frac{1}{\tau_c}\{\tau_c[(1+\gamma)(1+n)k_{t+1} - (1-\mu)k_t] - \\
&(\tau_c + \tau_y)F(k_t, l_t) - (1+\tau_c)g_t + p_t(1+\gamma)(1+n)b_{t+1} - b_t\} \\
&c_t = F(k_t, l_t) - (1+\gamma)(1+n)k_{t+1} + (1-\mu)k_t - g_t - tb_t
\end{aligned}
$$

Where the prices of the government bonds, the foreign bonds and the rate of return are equal by arbitrage. The government determines the tax rates, τ_c and τ_y, and the expenditure in each period, g_t, which determines its borrowing with equation (21). And this will end up determining the level of foreign borrowing and, consequently, the trade balance. The steady state of this economy is characterized by

$$
\begin{aligned}
&-\frac{u_c(c^*, 1-l^*)}{u_l(c^*, 1-l^*)} = \frac{(1+\tau_c)}{(1-\tau_y)F_l(k^*, l^*)} \\
&\frac{(1+\gamma)(1+n)}{\delta} = 1 + (1-\tau_y)F_k(k^*, l^*) - \mu \\
&p^* = q^* = \frac{\delta}{(1+\gamma)(1+n)} \\
&b^* = \frac{g^* - \tau_c c^* - \tau_y F(k^*, l^*)}{p^*(1+\gamma)(1+n) - 1} \\
&tb^* = (\gamma + n + \gamma n + \mu)k^* - \frac{(\tau_c + \tau_y)F(k^*, l^*) - (1+\tau_c)g^* + b^*[p^*(1+\gamma)(1+n) - 1]}{\tau_c} \\
&c^* = F(k^*, l^*) - (\gamma + n + \gamma n + \mu)k^* - g^* - tb^*
\end{aligned}
$$

The only new variable is the trade balance of the economy TB_t. In this case the balanced growth path of the economy is also characterized for showing a constant ratio between the trade balance and the output, TB_t/Y_t. The ratio between trade balance and output is shown in figure 26. What is distinctive in the figure is the heavy fall that lasts from the last quarter of 1984 until the second one of 1992 and the recovery at the end of the sample till reaching the level of 1970. The test for equality of means in table 14 between the previous and posterior subsamples to 1986 rejects that the averages are equal.

4.2.1 Conclusions

The observed ratio evolution of the aggregated variables over the output are not consistent with the balanced growth behaviour inferred by the neoclassical growth model. The private consumption/output and the trade balance/output ratios show an average change in the mid 80's. Such change does not seem to be observed in the investment/output ratio, although there are great oscillations in its evolution. On the other hand, the public expenditure/output and the need of financing/output ratios show strong trends in the 70's and 80's. The average

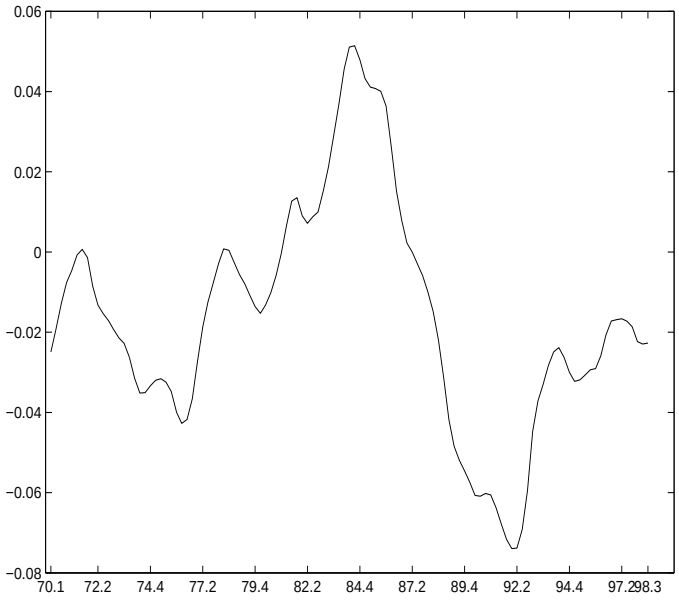


Figure 26: Trade balance over GDP

Trade balance/output ratio	
$\overline{X}_1$	-0.0041
$\overline{X}_2$	-0.0309
$\overline{X}_1 - \overline{X}_2$	0.0268
Acceptance Region	(-0.0095 0.0095)

Table 14: Test for equality of means of the trade balance/output ratio.

hours worked per employee or per wage-earner also show a heavy fall until the 90's. There is also evidence of a significant change in the averages of the growth rates of TFP, output per hour worked, capital per hour worked and real wage per hour worked after 1986. In these variables, there only seems to be favourable evidence to balanced growth in the posterior subsample to 1986, because the equality of the averages of such variables can only be accepted for this sample.

A crucial aspect in the computational experiments carried out with artificial economies to give a quantitative answer for some interesting question is the calibration of the model. The calibration is to choose the values of some parameters of the model, so that the model reproduces reality in some dimensions considered key. In RBC literature the ratios checked here are usually used as those dimensions considered keys and that the model must reproduce. The idea is to obtain a long-term value for such ratios by calculating the average values of the ratios in reasonable periods of time and to use the steady state relationships of the model in order to choose the values of the parameters, so that we can reproduce the long-term values of the ratios observed.

The behaviour of the main ratios of the macroeconomic variables of the Spanish economy, developed in the previous sections, raises reasonable doubts about the ability of capturing long-term behaviour of the Spanish economy by using the average values of such ratios, at least, with samples including data from before 1986, so that the calibration based on these average values cannot capture the key dimensions of the long-term behaviour of the Spanish economy.

5 Empiric Methods for the Analysis of the Cycle

Robert Lucas (1977), defines economic cycle as the deviations of the aggregated real output of the trend. This definition is completed in the framework of a theory like the neoclassical growth model revised in its determinist version in section 4. In the stochastic version of such model, either if they are considered stochastic or determinist trends, the trends of the per capita variables of the model is a common one and equal to the technical progress growth rate expected. Given the doubts raised in section 4 about the aptitude of the neoclassical growth model to capture the long-term of the Spanish economy, the procedure to extract the trend of the economic variables has to be more flexible. In general, the profession has used linear filtering procedures.

5.1 Linear Filtering

In figure 1 we can see the logarithm of the real GDP of the Spanish economy from 1970 to 1998 with a quarterly periodicity. It is impossible to separate the cyclical fluctuations of the long-term component of the series without any other refinement. Therefore, from an empiric point of view it is necessary to use a method that can isolate the cyclical fluctuations of the secular component of the series.

An explicit procedure to break down a variable into its trend and cyclical component is necessary for the definition of economic cycle to become operative. Thus, the most recent studies of the properties of the economic fluctuations have frequently used linear filters [4] to

[4] A linear filter is a set of weights $\{\omega_i;\ i = 0, \pm 1, \pm 2, \ldots\}$ that is applied to a temporal series y_t, so that the filtered series is $\sum_{i=-\infty}^{\infty} \omega_i y_{t-i}$. If $\omega_i = 0$, $\forall i < 0$ it is said that the filter is a one-sided one. In other cases it is said to be a two-sided one.

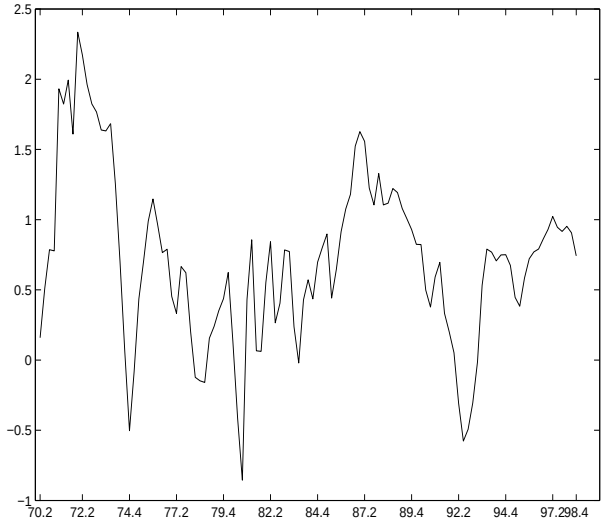


Figure 27: First difference of the logarithm of the real GDP. 1970.1-1998.4.

distinguish between the trend and the cyclical component of the economic temporal series.

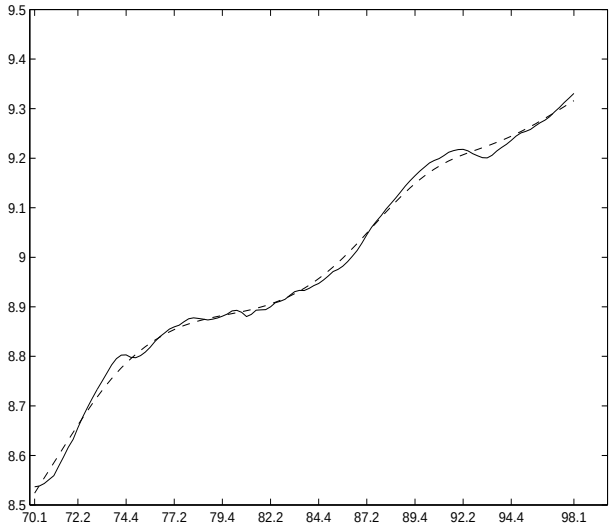
One of the possibilities is to obtain the residuals from a regression of the logarithm of the real GDP over a linear trend. In section 2 residuals were built by using several linear trends. This way of extracting the trend is compatible with the neoclassical growth model and it could be admitted if the long-term of the series were a linear trend, that is, if GDP were stationary around a linear trend. From an empiric viewpoint it does not eliminate short-term fluctuations that can be considered not to be related with the economic cycle. Such fluctuations are the so-called seasonal or irregular components of a series (they are not in the case of GDP because Quarterly National Accounts (QNA) eliminates these high frequency elements). On the other hand, in Martínez and Espasa (1998) it is stated that the behaviour of the real Spanish GDP is compatible with integrated processes (one or two unitary roots), in whose case to adjust a linear trend implies to generate spurious cycles.

If the real GDP shows a unitary root, it is stationary in differences, so, a way of eliminating the trend is to take a difference of the series. When logarithms have been taken, the first difference transforms the series into quarterly growth rates. The quarterly growth rates of GDP are shown in figure 27 (the growth rates are scaled to express percentage points of a yearly rate). However, the first difference amplifies the importance of the high-frequency, seasonal, and irregular components (measuring errors, strikes, etc.), darkening the cyclical fluctuations that are the ones we are interested in this work.

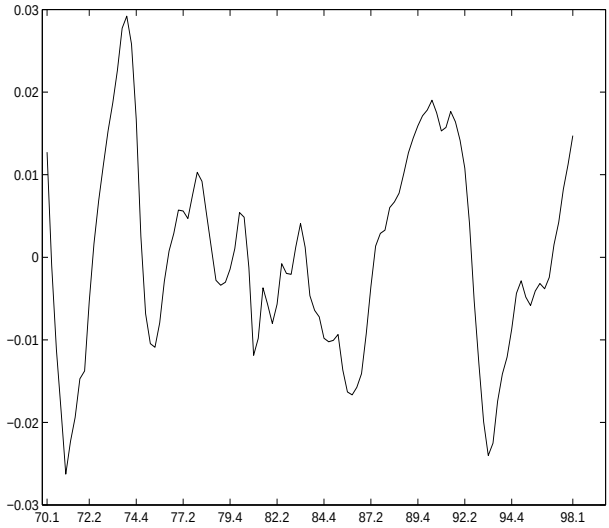
Thus, one of the most widely used filters in the literature of economic cycles is the Hodrick and Prescott (1980) one, that obtains the trend of a variable, τ_t, in such a way that it solves the following problem

$$\min_{\tau_t} \sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} \left[(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}) \right]^2$$

where y_t is the temporal series, τ_t the trend and T the sample size. The first term of the expression is a measure of the distance of each observation about the trend and the second one is a measure of the distance among three consecutive values of the trend, so that the λ



28.1: Real GDP and its HP trend (logs). (−GDP, (−−) Trend.



28.2: Cyclical component of GDP. H-P filter. $\lambda = 1600$.

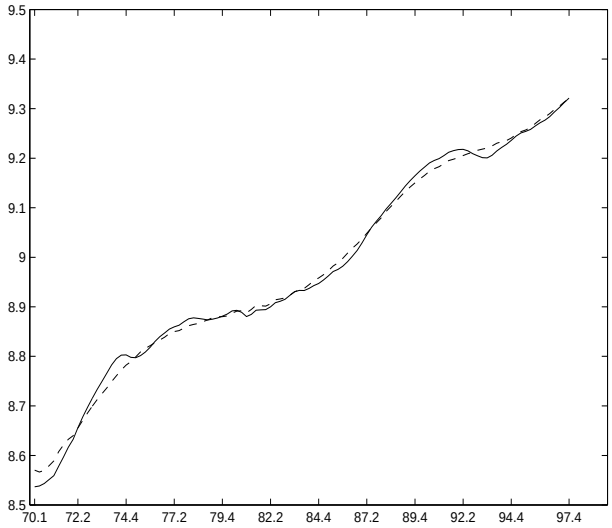
Figure 28: Cycle-trend decomposition of the real GDP by means of the H-P filter.

parameter penalizes the variations of the trend and, therefore, controls the smoothened level of the trend. For quarterly data these authors propose $\lambda = 1600$. Figure 28 shows the trend and the cyclical component of the Spanish real GDP obtained by using this filter.

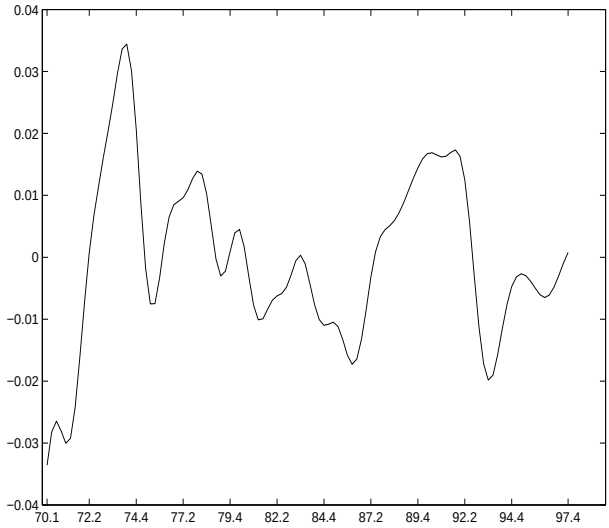
Baxter and King (1995), using typical considerations of the spectral analysis of temporal series, suggested to filter the series so that the periodical components of a temporal series that belong to a frequency specific band. They are the so-called Band-pass filters. They use the symmetrical moving averages for it. The height of the spectrum of a series at a certain frequency corresponds to fluctuations of an inversely associated periodicity with this frequency. Thus, the cyclical component of a series can be understood as the movements in the series associated with periodicities within a certain duration range of economic cycle considered. On following a long tradition in the literature of economic cycles, these authors propose a band that goes from six to thirty-two quarters for the quarterly data. They also show how the H-P filter is a high- pass filter that isolates the components of the series with a periodicity of less than thirty-two quarters, that is, the high-frequency ones. Figure 29 shows the cyclical component of the Spanish real GDP obtained with the B-K filter, using 12 terms for the moving average.

By taking a look at it, we can see a similarity among the cyclical components obtained by means of the H-P and the B-K filters when applied to the Spanish real GDP. As mentioned before, this may be due to the fact that QNA eliminates the high-frequency elements. On the other hand, the trends obtained by means of both H-P and B-K filters are quite far from being straight lines, and show two important waves in the long-term component of the GDP.

In this work, we use several filters to verify the robustness of those filters of the regularities found in the series. Canova (1998), and other works mentioned in that article, thinks that the cyclical properties of the series change according to the filter used. Since different filters extract different information of the series, it is not surprising that the outcome of the statistics used over the cyclical components are quantitatively different. The task here is to check



29.1: Real GDP and its BK trend (log). (−)GDP, (−−)Trend.



29.2: Cyclical component of GDP. B-K filter. $K = 12$.

Figure 29: Cycle-trend decomposition of the real GDP by means of the B-K filter.

whether the stylized facts keep, at least, qualitatively equal with different filters, so that invariant stylized facts with different filters obtain an additional confirmation.

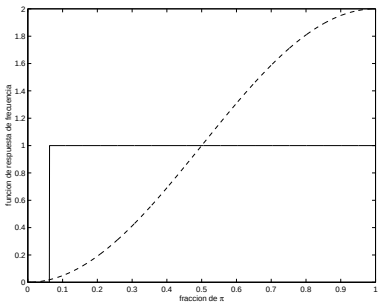
Thus, the first difference of the series H-P and B-K filters, will be used[5]. In the previous discusion it is clear that the B-K filter excludes the seasonal and irregular component of a quarterly series, which does not happen when differences are taken or the H-P filter is used. In the latter two cases, before using the filter, the seasonal component of the series will be eliminated by using TRAMO and SEATS (Gómez and Maravall, 1997).

5.2 Comparison of the Filtering Methods

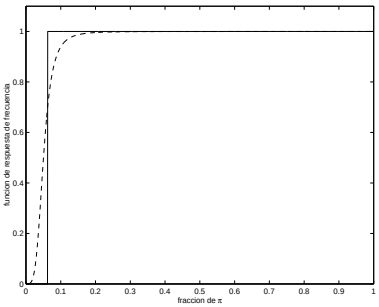
Before examining the stylized facts of each group of series, it is worth examining the effects that the different filtering methods are going to have on the series used. Although something has been said in the previous section, what is stated here will contribute to clarify their differences. For that purpose, it is necessary to introduce some spectral analysis element. It has already been said that to apply a linear filter to y_t temporal series means to obtain another x_t temporal series in the following way

$$x_t = \sum_{h=-\infty}^{\infty} \omega_h y_{t-h}. \tag{22}$$

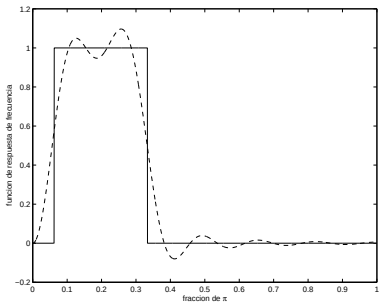
[5]The BK filter uses symmetrical moving averages so K (the number of terms of the moving average) observations are lost at the beginning and at the end of the sample. On the other hand, Baxter and King (1995) recommend to ignore the data of the years on both sides of the series when the HP filter is used. If we want to avoid these two effects the values of the series can be forecast twelve periods at the beginning and twelve periods at the end of the sample, by using TRAMO and SEATS.



30.1: First differences.



30.2: H-P filter. $\lambda = 1600$.



30.3: B-K filter. K=12.

Figure 30: Frequency response functions of the filters.

On the other hand, a stationary temporal series admits the following representation

$$y_t = \int_{-\pi}^{\pi} e^{ivt} dz(v)$$

where $dz(v)$ is an orthogonal-increase process, i is the imaginary number and v is the frequency measured in radians ($-\pi < v < \pi$), (vid. Brockwell and Davis, 1991, Cap.4). The series filtered with a filter like (22) can be expressed as follows

$$x_t = \int_{-\pi}^{\pi} \alpha(v) e^{ivt} dz(v)$$

with

$$\alpha(v) = \sum_{h=-\infty}^{\infty} \omega_h e^{-ivh}$$

where $\alpha(v)$ is the filter frequency response function, that is $\alpha(v)$ indicates the magnitude with which x_t responds to the v frequency of y_t, that is, the weight assigned to the periodical component associated with the v frequency.

The ideal filter would be the one that could give zero weight to the frequencies we want to eliminate and one to the ones we want to keep. Thus, the ideal filter will have a frequency response function $\alpha(v) = 1$ for $v^b \leq |v| \leq v^a$, where v^b and v^a are frequencies determined before and $\alpha(v) = 0$ for the rest of the frequencies. In our case, if the filter is a high-pass one, like in the first differences, or a H-P one, theses values will be $v^b = \pi/16$ and $v^a = \pi$; whereas if the filter is a Band-pass one like B-K, the values will be $v^b = \pi/16$ and $v^a = \pi/3$, that are the ones corresponding to thirty-two and six quarter periods.

Figure 30 shows the frequency response functions for each filter considered and the one that would correspond to the ideal filter in each case. It can be observed how the first differences eliminate the low frequencies and stresses the high frequencies. The H-P filter does not eliminate so many low frequencies, but it gets very close to the ideal filter from frequencies around $\pi/10$. The B-K filter eliminates the high and low frequencies keeping the components with fluctuations between six and thirty-two quarters. However, since it is a finite approximation of an infinite moving average, it does not correspond exactly with the ideal filter.

The effects of the kind of filter on the macroeconomic series studied will depend on the characteristics of each series. For example, in many macroeconomic series, the components

with high-frequency fluctuations are not very important, that is, they do not make the series very variable. In that case, we should observe that the absolute volatility of the cyclical component obtained with the first differences is much smaller that the one obtained with the H-P filter, and this filter will show an inferior volatility to the one obtained with the B-K filter.

The reason becomes obvious after the discussion in the previous paragraph: the first differences weight the high frequencies much more than H-P and this one more than B-K. If the high-frequency components of the temporal series have little variability, the previous result is logical.

A clear example is the series of the QNA. The government statistical bureau (INE) tries to eliminate the seasonal and irregular component of the series, both of them high-frequency components. When the series are H-P and B-K filtered, the results are very similar, because these high-frequency components are the ones excluded by the B-K filter, but considered by the H-P filter. See, for example, figures 28 and 29 for a visual comparison and table 15 for a comparison of the statistics.

Important differences can be seen in the persistence of the series measured by autocorrelation function. Note that the low-frequency components of the series are very persistent, whereas the high-frequency ones will be less persistent. Therefore, we will see that the filters that assign more importance to the high frequencies will produce less persistent cyclical components. Thus, the first differences of the series will be quite less persistent than H-P and this one less than B-K.

The same thing happens with the correlations with GDP, that is, the more importance the filter assigns to the high frequencies, the smaller correlation the cyclical components of the variable will show with that of GDP, because GDP does not contain much information in the high frequencies.

Compare the statistics in table 15, that refers to the cyclical component of the investment (or any series of QNA) and to the Industrial Production Index (IPI). In the case of the investment there are not great differences among filters because of the "INE effect". Still, the first differences show a very inferior volatility to the H-P and B-K filters. On the contrary, the statistics of the cyclical component of the Industrial Production Index, where only the seasonal component (for the first differences and for H-P) has been eliminated, show greater differences among filters. The first differences of IPI show a smaller correlation with GDP and a low autocorrelation coefficient, whereas H-P and B-K show a greater correlation with GDP, also with greater autocorrelation coefficients.

5.3 The Shape of the Spectrum of GDP Growth

The spectral density of the macroeconomic variable growth rate supplies important information about the nature of the economic cycle. Figure 31 shows the spectral density of the quarterly GDP growth rate. The two vertical lines correspond to the frequencies between six and thirty-two quarters.

Two facts relative to the shape of the spectrum of figure 31 can be highlighted. First, the spectrum is small at very low frequencies, increases until reaching a peak and then decreases at very high frequencies. This is the so-called typical shape of the spectrum of the growth rate, that most macroeconomic temporal series present. Second, the economic cycle frequency interval does not have the spectral density peak. This means that the most important contribution to the volatility of the Spanish GDP growth rate corresponds to a frequency that is not usually considered in the economic cycle. The frequency that shows

First differences						
	GDP	Consumption	Investment	Capital	Total Hours	IPI
Standard Deviation	0.617	0.707	2.252	0.4052	0.916	3.930
Correlation with GDP	1	0.83	0.80	0.45	0.65	0.39
Autocorrelation	0.8599	0.8961	0.8481	0.9920	0.7595	-0.1238
Hodrick-Prescott						
Standard Deviation	1.384	1.361	5.562	0.4718	1.75	5.210
Correlation with GDP	1	0.86	0.86	0.31	0.65	0.69
Autocorrelation	0.9336	0.9295	0.9375	0.9722	0.9439	0.7400
Baxter-King						
Standard Deviation	1.376	1.397	5.270	0.5372	1.662	2.137
Correlation with GDP	1	0.86	0.84	0.32	0.81	0.70
Autocorrelation	0.9584	0.9491	0.9536	0.9866	0.9519	0.9071

Table 15: Comparison of statistics for different filters. Source INE and own computations.

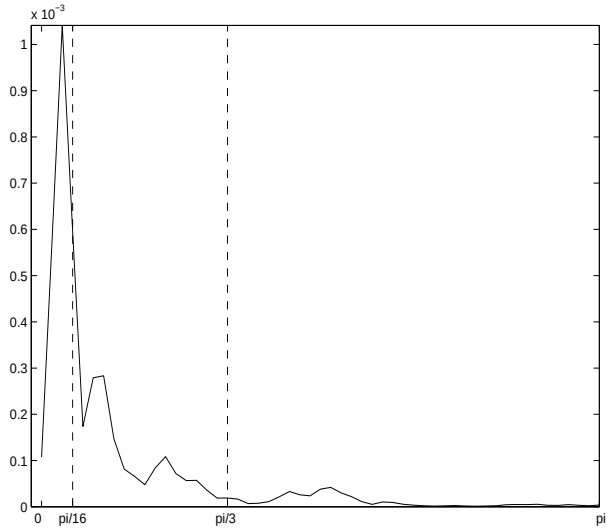


Figure 31: Spectral density of the growth rate of GDP. 1970.1-1997.2.

the peak corresponds to a period around fifty and four quarters, that is, thirteen years. The economic cycle frequency interval explains about 42% of the variance of the growth rate.

The latter fact highlights the different behaviour of the Spanish GDP growth rate in the frequency domain with relation to other countries. Figure 32 shows the spectral density of the GDP growth rate of France, Italy and the USA. As we can observe, the GDP growth rates of those countries also shows the typical shape of the spectrum of the growth rate, but the cycle frequency interval has the spectrum peak.

The spectrum of other Spanish macroeconomic variables is shown in figure 33. It can be observed that the shape of the spectrum for these variables has similar characteristics to the ones presented for GDP. This fact can be applied to the main Spanish macroeconomic temporal series.

In short, the shape of the spectrum of the growth rates of the Spanish macroeconomic variables has an important implication: The fluctuations of the Spanish economic growth rate are governed by lower frequencies than those traditionally considered of economic cycle by the literature of economic cycles.

This feature of the Spanish economy is in accordance with the evidence that Forni and Reichlin (1997) find for several nations, states and regions of the European Union. For Spain, Lopez et al. (1997) conclude that there is a long-duration economic cycle of about fifteen years approximately. What seems clear is that the cyclical behaviour of the Spanish economy is governed by different frequencies from the ones that govern the economic cycle of the economies formerly mentioned. The challenge of this fact for the economic analysis is to explain why the cyclical behaviour of the Spanish economy is governed by low frequencies.

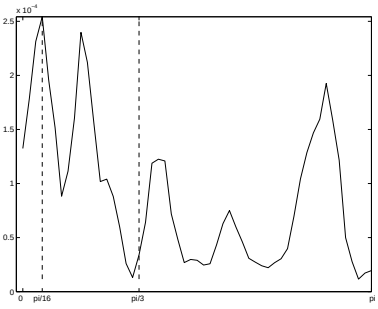
6 Cyclical Behaviour of some Temporal Series.

6.1 Data and Statistics used

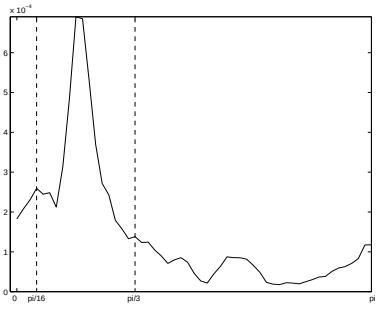
The series studied in this paper can be grouped into ten categories: employment and sectoral output; GDP components of national accounting; aggregated employment, productivity and productive capacity use; prices and wages; interest rates and share prices; monetary aggregated; benefits and labour share in the rent. All the series used are described in detail in appendix A.

Most of the series have changed on taking logarithms, except for the interest rates, the productive capacity use and the variables that are balances. The sample covered is 1970.1-1998.1. The existence of changes in the behaviour of the most important ratios of aggregated magnitudes has been stated in the former sections. Such changes also happen in the mid 80's. That is the reason why it seems appropriate to study two samples instead of only one: the first one would run from 1970 to 1985 and the second one from 1986 to 1998.

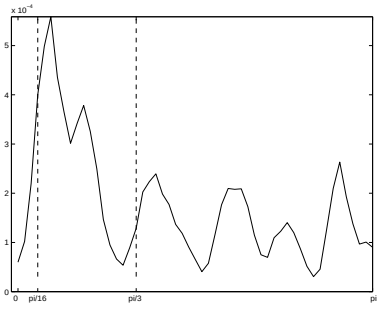
There are two sets of stylized facts that show the comovements between each of the series and the real GDP for both the whole sample and each of the subsamples. The first set consists of the crossed correlations of the cyclical components of each of the series with the cyclical component of the real GDP, that is, the correlation between the current cyclical component, x_t and y_{t+k}, the k-th quarterly lead or delay of the logarithm of the filtered GDP. A positive (negative) correlation with a high absolute value in $k = 0$ will indicate a procyclical (anticyclical) behaviour of the series. A maximum absolute value of the correlation in $k < 0$ ($k > 0$) will indicate that the cyclical component of the series tend to delay (lead) the cyclical component of GDP in K quarters. The standard deviations of the cyclical components of



32.1: France.

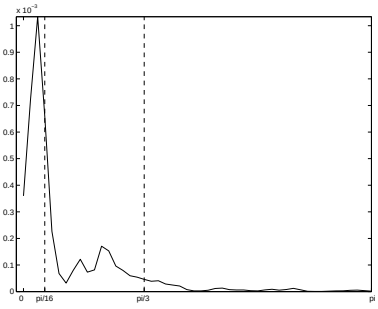


32.2: Italy.

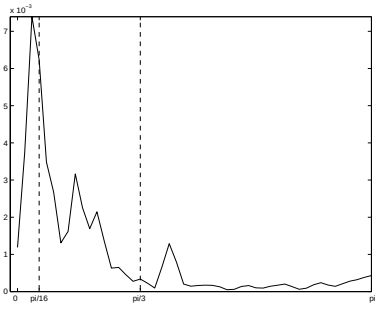


32.3: USA

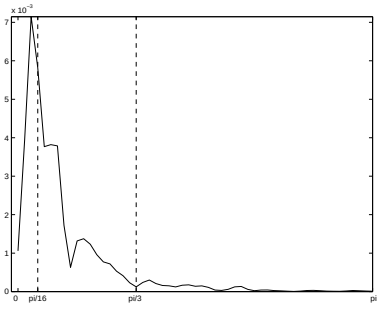
Figure 32: Spectral density of the growth rate of GDP for several countries. 1970.1-1997.2.



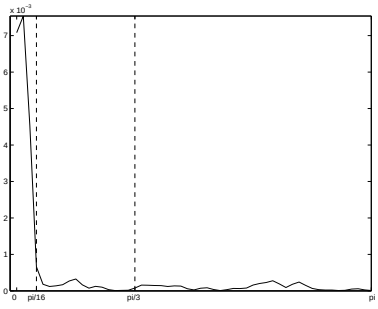
33.1: Consumption of non-durable goods.



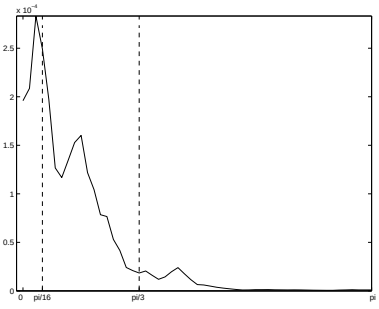
33.2: Consumption of durable goods.



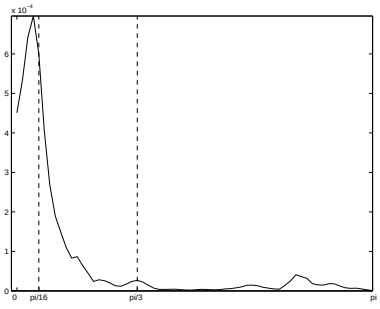
33.3: Gross capital formation.



33.4: Consumer price index.



33.5: Net exports.



33.6: Employment.

Figure 33: Spectral density of the growth rate of other macroeconomic series. 1970.1-1997.2.

the series and the contemporary correlations among them are also presented. The standard deviations are comparable among series when they have the same units. If the series are in logarithms, the units are a percentage of deviation of growth trends and for the other series, it is the units of the series such as they are described in appendix A.

The second set of facts deals with the lead-delay relations among the cyclical components of the different series and the aggregated output from the point of view of Granger causality. The concept of Granger causality is quite different from what causality usually means. Granger causality attempts to determine whether the movement of a temporal series precedes or is contemporary to the movements of other temporal series, that is, whether the past and current values of a series help us forecast the future values of another series. Thus, it would be more coherent to use the word "lead" to refer to this concept instead of "Granger causality" because it can be confusing. However, we will use the name usually used by econometric literature. If we want to contrast whether a x_t series does not show Granger causality to another y_t one, we must contrast whether in the regression of y_t over the delayed values of y_t and x_t, the parameters of these latter variables are zero, where y_t and x_t are cyclical components of the output and of the candidate series to show Granger causality to y_t. If we reject this null hypothesis, we will state that the present and past values of x_t help us forecast the future output, in view of the present and past values of the output, that is, x_t precedes the aggregated output. The former test is carried out on two regressions; the first one of y_{t+1} over $(y_t, \ldots, y_{t-4}, x_t, \ldots, x_{t-4})$ ($\mathrm{H}_0 : x_t$ does not show Granger causality to y_t) and in the second the roles of y_t and x_t are interchanged ($\mathrm{H}_0 : y_t$ does not show Granger causality to x_t). The tables in appendix B show the values of the F statistics corresponding to the former test and its critical value for different significance levels.

6.2 Sectoral Employment and Output

6.2.1 Comovements

A crucial part of the qualitative facts associated with the economic cycle is the comovement of output and employment among different sectors of economic activity. Murphy et al. (1989) and Cooper and Haltiwanger (1990) report these comovements for the USA economy. There are, at least, two kinds of theories about the relationship between the cyclical fluctuations of the different sectors and the aggregated cycle. Some theories consider that the fluctuations generated by sectoral shocks are important aggregated fluctuation-generating sources, whereas other theories say that, although the sectoral shocks may be important, some positive shocks are compensated by other negative ones, so that the only shocks that govern the cyclical fluctuations both of the sector and of the aggregated economy, are the aggregated shocks. The fact that the main cyclical fluctuation- generating source are the aggregated disturbances or specific sectoral shocks has important consequences when it comes to designing economic models, because they must specify a shock spread mechanism that is coherent with one or other fluctuation-generating source.

Although this debate requires a deeper, more sophisticated approach than the one presented here, some conclusions can be obtained from the study of the basic statistics presented in the tables in appendix B. These tables present statistics for two kinds of series according to their degree of aggregation. The group that will be referred to as "less disaggregated" corresponds to the traditional classification in agriculture, industry, construction and services, whereas the group called "more disaggregated" corresponds to the sectoral classification of energy and water industry, non-energetic mining and chemical by-products, metal-processing

and precision engineering industry, and other manufacturing industries.

On examining the crossed correlations and the employment series and the Gross Value Added (GVA) with the cyclical component of GDP, corresponding to the less disaggregated sectoral division, a high level of procyclicity, that is manifested for the three filtering methods used, can be observed. The GVA of the industry, construction and sale services are highly procyclical whereas the procyclicity of non-sale services is much lower and in the case of agriculture is null. The employment in these sectors has a very similar behaviour: it is very procyclical in industry, construction and services and almost acyclical in agriculture.

These observations allow us to affirm that both GVA and employment in agriculture have an acyclical behaviour, whereas the GVA and the employment in industry, construction and sale services have a much less procyclical behaviour than the former sectors in this classification.

The more disaggregated sector employment series behave less procyclically than the more aggregated employment series. If we look carefully, we can observe three sectoral groups with respect to their degree of comovement with GDP:

- Quite procyclical sectors (higher correlation than 0.5): "construction", "metal-processing and precision engineering industries", "other manufacturing industries", "commerce and hotel services" and "finance and insurance services".
- Moderately procyclical sectors (correlation between 0 and 0.5): "non-energetic mining and chemical by-products", "comunication and transport" and "other services".
- Acyclical sectors (0 correlation): "agriculture, livestock and fishing" and "energy and water".

This way of grouping them confirms the acyclicity of the primary sector of the economy, along with the energy sector. As for the more disaggregated output indicators, the industrial production indexes behave in quite a procyclical way for metal-processing and precision engineering industries and the general index. The I.P.I. of energy and water become very unprocyclical again, whereas non-energetic mining and chemical by-products, and other manufacturing industries are procyclical to a slight extent.

On the other hand, the correlations among the GVA series, employment and I.P.I. are positive and high, except for agriculture and the water and energy sector.

The mentioned behaviours can be interpreted as evidence in favour of the existence of positive comovement among the different sectors, except for agriculture and the energy and water industry.

If we accept the theories that consider that the aggregated disturbances are the main cause of the economic cycle, then the aggregated cyclical fluctuations and the sectoral ones must be related in a particular way. Although there can be disaggregated dynamics at a sectoral level, it should not affect the aggregated one to such an extent. On the contrary, the aggregated fluctuations would govern the sectoral ones. In other words, if the aggregated fluctuations cause the sectoral fluctuations, the latter ones should move with some delay compared to the aggregated one or should lack additional forecasting information about the aggregated one. On the contrary, the aggregated fluctuations must have forecasting capacity about the sectoral variables. This is the information supplied by the F statistics of the Granger causality test, that are presented in the tables in appendix B.

It seems clear that the growth rates of the sectoral variables do not have forecasting capacity over the growth rate of the G.D.P. for any of the subsamples. In general, very few sectoral variables show forecasting capacity over the growth rate of GDP. On the contrary, the number of sectoral variables that GDP has forecasting capacity for is very high. The

conclusion is not so clear with the other filters. The only thing that can be clearly observed is the forecasting capacity in both directions for many of the sectoral series. This fact suggests the possibility that the relation between aggregated and sectoral fluctuations may be a more complex one than what the two former theoretical approaches state. The observed fluctuations, both at sectoral and aggregated level, may be the result of a combination of both kinds of shocks, some aggregated and others sectoral.

6.2.2 Volatility

Agriculture and construction are the most volatile sectors in terms of output. These sectors show the highest relative volatilities of the G.V.A. (relative to GDP). The IPI ones are much more volatile than GDP. As for employment, the sectors of construction and energy and water are the most volatile ones, whereas service employment is the least volatile.

In general, the volatility of employment series is higher than that of the cyclical component of real GDP. If we consider that aggregated employment is almost as volatile as GDP, this observation would indicate that the employment movements at sectoral levels are much higher than what the aggregated employment reveals. Moreover, there is a behaviour change in subsamples. The aggregated employment shows a higher volatility after 1986, which suggests that the intensity of comovements in sectoral employment is higher after that date, as the highest correlations among sectoral employment seems to corroborate for the second part of the sample.

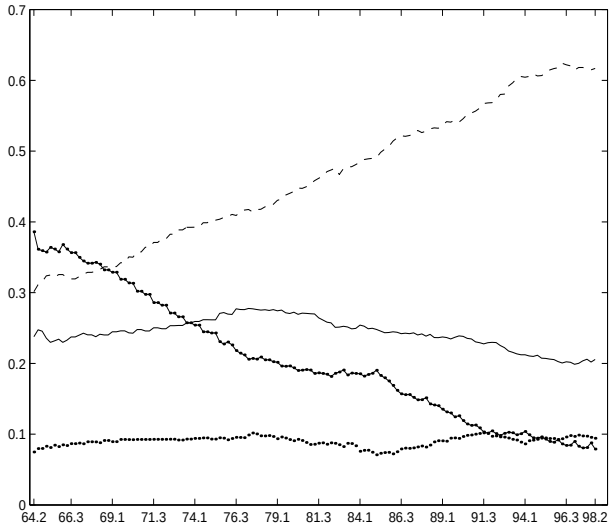
In the GVA series we can see that the relative volatility in agriculture, construction and non-sale services increases after 1986 and the relative volatility in industry and sale services decreases. The employment series are less volatile and become more procyclical, like IPI ones.

Despite the analysis of the sectoral cyclical behaviour, it is worth mentioning that during the analyzed sample there have been important changes in the proportion that the employment of each sector represents in the total employment. Figure 1.34 shows the evolution of that proportion for employment and the GVA of each sector. For example: in 1970, the GVA of agriculture was 6.7% of GDP, that of industry was 27.4%, the one corresponding to construction was 10.1% and that of the services 51.7%. In 1988 those proportions are 4.2%, 28.4%, 7.1% and 54.8% respectively. There is a moderate fall in the agriculture share and construction share-about two or three percentage points- in the output, and an increase in industry and services. However, the proportions of the total employment of those sectors in 1970 were 31.8% for agriculture, 24.3% industry, 9.2% construction and 35% services. In 1998 those proportions were 9.8%, 22.5%, 9.6% and 58%, respectively. In the composition of employment there has been a great decrease in the agriculture sector and similar increase in the service industry. These facts have been studied in depth by Marimon and Zilibotti (1998). However, the effects on the growth of the economy and the cyclical behaviour of such a dramatic shift of the labour factor among sectors require deeper research than the one carried out up to now.

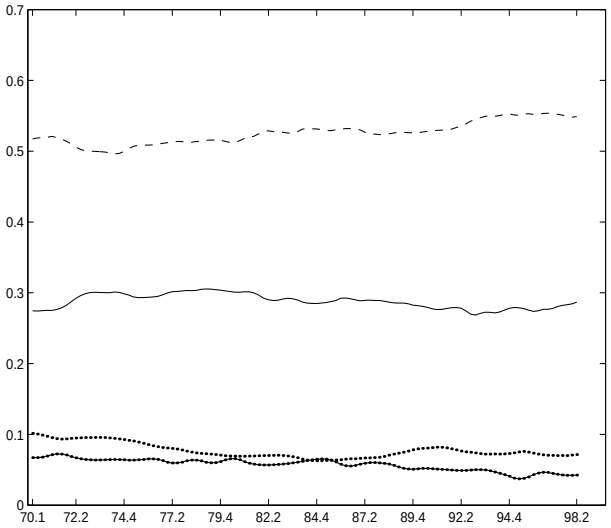
6.3 Components of GDP

The set of statistics, in reference to what aggregated accounting call “components of GDP”, is one of the statistic sets usually used in R.B.C. literature. That literature usually considers the following facts as the main stylized facts:

1.- The consumption of non-durable goods fluctuates much less than the output.



34.1: Sectoral employment over total employment. Agriculture $(\cdot-)$, Industry $(-)$, Construction $(\cdot\cdot)$, Services $(--)$. 1964.2-1998.2



34.2: GVA of each sector over GDP. Agriculture $(\cdot-)$, Industry $(-)$, Construction $(\cdot\cdot)$, Services $(--)$. 1970.1-1998.2

Figure 34: Evolution of the share of each sector in employment and the GVA.

2.- The investment and the consumption of durable goods fluctuate much more than the output.

3.- The public expenditure is not correlated to the output.

4.- Imports are more intensely procyclical than exports, which makes the trade balance countercyclical.

6.3.1 Consumption

A fact that has already been stated by different authors, Dolado et al. (1993), Ortega (1994), Licandro and Puch (1997), Martín-Moreno (1998) and Giménez and Martín-Moreno (2000), is the high volatility of the Spanish aggregated consumption. Actually, no matter what definition is used for the cyclical component and for all the subsamples considered, the volatility of the aggregated consumption is very similar to that of GDP, if not higher.

On the other hand, the cyclical volatility of the aggregated consumption components differs substantially. Whereas the consumption of durable goods is very volatile, the consumption of non-durable goods is much smoother. The latter observation is less surprising if we take into account that the consumption of durable goods measures the expenditure in durable goods and not their service flow. This is compatible with a smooth durable good service flow and it just indicates that the buying of those goods is concentrated in good times.

Literature considers the smaller fluctuation of consumption with relation to income as a confirmation of the life-cycle theories. These theories model the behaviour of consumers or families assuming that they optimize an intertemporal objective function which is called utility function, subject to a budget constraint. In this approach it is assumed that families take their decisions by taking all their life-cycle into account. When there is uncertainty and

there are no transaction limits, the optimal choices over consumption are characterized by conditions that are similar to the following.

$$-\frac{u_l(c_t, 1-l_t)}{u_c(c_t, 1-l_t)} = w_t \tag{23}$$

$$u_c(c_t, 1-l_t) = \delta E_t[(1+r_{t+1})u_c(c_{t+1}, l_{t+1})] \tag{24}$$

where δ is the temporal discount factor, $u(\cdot)$ represents the instant utility of the consumer, c consumption, l time dedicated to the market, r the saving rate of return, w the earnings of the time dedicated to the market and E_t the expectation subject to the available information in each moment.

On the other hand, the theory of the "permanent income hypothesis" considers the exogenous labour income exogenous and the saving rate of return constant or exogenous, so that the changes in consumption will react to unexpected changes in the future income (permanent or long-term income), whereas changes perceived as temporal have a minimum effect. As most of the surprises in the income are temporal, the consumption will be smoother than the income.

The R.B.C. theory considers the labour income and the saving rate of return endogenous, so that the surprises that affect the output also affect the saving rate of return and the real wage. Expressions (23) and (24) show the different effects that fluctuations in consumer income can have on consumption. Expression (23) highlights the influence of the elasticity of substitution between consumption and leisure. Expression (24) establishes the influence of the consumption intertemporal elasticity. R.B.C. literature usually assumes that the elasticity of substitution between consumption and leisure is equal to the unit, because the latter is compatible with the observation for the USA economy about the constance of the hours worked per capita since the 40's, whereas the real wage per hour has not stopped growing. Thus, the surprises in the output affect the saving rate of return so that the income effect produced by a surprise in the output is partially compensated by the substitution effect that makes the consumer take advantage of the increase in the saving rate of return, causing the smoothening of the consumption with relation to the output.

These approaches are questioned by the observation that the consumption in the Spanish economy is more volatile than the aggregated output. The reaction of the profession has been to find an explanation either in a higher effect of the consumption-leisure substitution (Martín-Moreno, 1998 following Correia et al., 1995), or in the limitations in the instruments to smoothen the consumption like the credit-cash constraints (Giménez and Martín-Moreno, 2000).

Table 16 establishes a comparison with different countries about the relative volatility of the aggregated consumption and its components. We can observe that the relative volatility of the Spanish aggregated consumption and its components is higher than the one observed in countries like the USA or Canada, but it is not the only case. The same thing happens in other countries like the United Kingdom and Holland. This difference in the behaviour of the consumption found in some European countries (for Sweden Jonsson and Klein, 1996 show similar outcomes with yearly data) and the USA implies a puzzle that must be dealt with in future research.

Another important consequence of expressions (23) and (24) is that the evolution of the consumption depends only on the current labour income (w), on the future saving rate of return (r) and on the preferences (u). In other words, this implies that, in terms of consumption, what matters is the present and future income and not the past one. According to this,

	USA.	Canada	France	Italy	United Kindogm	Spain			Holland
	70-97	70-97	70-97	70-97	70-97	70-97	70-85	86-97	81-97
Aggregate	0.8040	0.8217	0.8250	0.8397	1.0967	0.9834	0.9315	1.0733	1.0932
Durable	2.9312	2.8414	4.2465	2.9340	3.9922	3.0477	2.8631	3.3521	
Non Durable	0.5926	0.6516	0.6218	0.6902	0.9072	0.7738	0.7020	0.8977	

Table 16: Relative volatilities to GDP of aggregated consumption and its components. H-P filter. Source: OCDE, INE and own computations.

we should observe that the consumption leads the cycle and that the income does not have forecasting capacity on the consumption. However, statistics state that both the aggregated consumption and its components behave procyclically and, according to the crossed correlations, they move in a concurrent way with the aggregated output. Only the consumption of durable goods seems to lead the aggregated cycle in one or two quarters. Granger causality F statistics do not show evidence of forecasting capacity of the income over consumption.

The high values of Granger causality F statistics obtained for the aggregated consumption, for the differentiated and H-P filtered series, indicates that the consumption helps us forecast future output values, which is compatible with the interpretation that an exogenous innovation in the consumption is the cause of an aggregated cyclical movement, or that the adjustment in the consumption, as the outcome of the realization of an exogenous surprise on economy, is faster than the one in the aggregated output.

Another outstanding factor is the increase in the relative volatility of the aggregated consumption and its components in the second part of the sample (1986-1997). In view of the transformation that the credit markets of the Spanish economy experience in this period, with an important development and the progressive openness to the European credit markets, we should hope that the increase of opportunities to smoothen consumption means a smaller volatility after 1986. This fact seems to contradict the implications of the life-cycle models once again.

6.3.2 Investment, Public Expenditure, Imports and Exports

Investment is more volatile than consumption and output, and strongly procyclical. Both investment and its components seem to move in a concurrent way with the output. The inventory change is quite less volatile than the output reaching an average of 18% of the size of the quarterly changes in GDP.

On the other hand, the public expenditure is less volatile than the output and behaves procyclically.

Net exports show a clearly countercyclical behaviour due to the strong procyclicity of the imports and the null contemporary correlation with the GDP of exports. Both imports and exports are very volatile. The exports have a more complex dynamic relation with the output showing positive correlations with GDP delays, and negative correlations with leads.

6.4 Aggregated employment and productivity

We can get the following conclusions on examining the correlations of these variables with the cyclical component of GDP in the tables in appendix B:

- Quite procyclical variables (higher correlation than 0.5): labour force, employees, activity rate, total hours worked per employees and total hours worked per wage-earners.
- Moderately procyclical variables (correlation between 0 and 0.5): productive capacity use, vacancies, public wage-earners and total factor productivity (calculated with the hours of the wage-earners).
- Acyclical variables (null correlation): average hours per wage-earners, average hours per employee, average wage-earner productivity, average employee productivity, and total factor productivity (calculated with the hours of the employees).

The unemployment rate is countercyclical, specially in the second subsample. Also in the second subsample, the average labour productivity behaves in a clearly countercyclical way and the total factor productivities are acyclical.

The literature of the economic cycle has highlighted that the productivity is procyclical as one of the most important stylized facts, either if it is measured as labour productivity or as total factor productivity. The evidence presented here suggests that the lack of this procyclical behaviour of productivity is one of the most outstanding anomalies of the Spanish economy.

From a theoretical point of view, the cyclical behaviour of TFP is important because it is closely related to the impulses and the subjacent spread mechanism in the RBC models. These models interpret the total factor productivity, calculated by means of the Solow residual, as technological shocks that are the shocks that govern the cycle. If this is so, such total factor productivity should be clearly procyclical. Backus et al. (1995) report the strong procyclicity of the Solow residual for eleven different countries.

Another fact that contrasts with what was observed for other economies is the acyclicity of the average hours worked per worker. This contrasts with what was observed for the USA by Cooley and Prescott (1995) or Stock and Watson (1999) who find a positive correlation between that variable and the cyclical component of GDP. Fiorito and Kollintzas (1994) find clearly positive correlations between the productivity in terms of hours and the hours per worker in the manufacturing sector with the real GDP for all the countries in the G-7, except for France and Italy, whose data they lack. On the contrary, Kollintzas and Vassilatos (1996) observe the acyclicity of the hours worked per worker for the Greek economy.

The results observed for the labour productivity attract our attention if we take into account that this variable behaves clearly countercyclically in the second part of the sample, specially the productivity of the wage-earners in industry and services. Once again, this contradicts the models where the fluctuations are governed by technological shocks, because in these models the technological shocks cause changes in the marginal labour productivity, generating the procyclicity of the labour productivity.

Other alternative theories to technological shocks also forecast a procyclical behaviour in labour productivity as increasing returns, scale cost adjustments, externalities or specific human capital.

A possibility that may explain these inconsistencies with the RBC theory is that the factors of production are not correctly measured. The series of average hours worked per wage-earner was obtained from the Wage Survey (WS) elaborated by INE. This is a survey whose sample units are the establishments of the industrial and service sectors. The series of average hours worked per employee was obtained from the Labour Force Survey (LFS), also elaborated by INE. In this case the sample units are the households included in the sample of LFS. First of all, it is obvious that to use the hours of the WS to measure the total hours worked in the economy implies that the average hours worked in the primary sectors

of the economy are equal to those in the industry and services. Secondly, both the WS hours and the LFS hours do not take into account the different qualification of the hours worked per each individual considered in the surveys. Anyhow, these measures of the labour factor do not differ from the ones used in the works mentioned formerly and that obtain opposite results to the ones found for the Spanish economy.

The unemployment rate and the vacancies are very volatile. The former one is almost five times as volatile as the output whereas the vacancies are twenty times more. The hours worked per employee are less volatile than the output whereas the aggregated employment and the total hours worked are more volatile than GDP.

Fiorito and Kollintzas (1994) find that the hours worked per employee in manufactures are more volatile than GDP for all the countries in the G7, except for the U.S.A. In Cooley and Prescott (1995) the same observation for the U.S.A. is reported. In this case it is the low volatility of the hours per employee observed in Spain the one that coincides with what was observed for Greece by Kollintzas and Vassilatos (1996).

Another stylized fact that has been highlighted by the RBC literature is the almost null correlation between the average labour productivity and the hours worked per employee. This observation is known as the Dunlop-Tarshis paradox. In the Spanish case, we can observe in tables 38-43 that the relation is significantly negative or null for all the subsamples. On the other hand, the measure of real wage, the deflated average earnings per hour, also shows a negative or null correlation with the measures of hours per worker.

The null or negative correlation between average labour productivity and the hours worked, or between real wage and hours worked has been, and still is, one of the challenges that the aggregated economic models have to overcome in order to be considered empirically acceptable. The existence of a negative correlation between these two variables is compatible with models in which the relation between real wage and hours worked is established either by means of a stable curve of decreasing marginal labour productivity, or with models where it is assumed that the technological shocks affect the employment but do not affect the labour income. On the contrary, models with an aggregated technological shock will generate fluctuations in the employment because they affect the marginal labour productivity generating a positive relation between real wage and hours worked. Another alternative in the standard RBC model is to consider that several sources of shocks govern the fluctuations of the economy. For example, Christiano and Eichenbaum (1992) study the implications of considering shocks in the public expenditure, that affect the individual decisions between consumption and leisure. This induces negative comovement between output and hours worked that can compensate the effect of the technological shocks. Thus, the model can produce a correlation between productivity (wage) and hours that is lower than the standard models, but is far from the correlation observed for the U.S.A. Licandro and Puch (1997) apply this model to the Spanish economy and they obtain similar results.

Since the Spanish labour market shows a high degree of trade-unionization, an interesting alternative could be the proposal in Boldrin and Horvath (1995). These authors propose a non-Walrasian mechanism for the labour market, introducing labour agreements between employees and employers assuming that the former ones do not have access to the capital market and have a higher risk aversion than the latter ones. These agreements let the workers hedge against bad times in exchange for getting a wage under the marginal productivity in good times. The effect of these agreements is a more flexible labour supply. Therefore the volatility of employment is increased. In this model, the wage does not follow the productivity, led by the technological shock, and can produce a negative correlation between wage and output. However, it produces procyclicity in the average labour productivity.

Galí (1999), who does not follow the standard RBC model, proposes a model of monopolistic competition, sticky prices and variable labour effort that produces a null or negative correlation between output and hours worked. In this model the technological shocks generate a negative correlation between output and hours, whereas non-technological shocks generate a positive correlation between the same variables. In this model, when there is a positive technological shock, the demand may remain constant or grow very little, so that less labour is needed to satisfy the demand before the shock is produced.

The productive capacity use rate is about twice as volatile as the output and is moderately procyclical. From a theoretical point of view, the aggregated production function defines a relation among the output flow and the service flow of physical capital and labour. The output flows and the labour services are well captured by the measures of GDP and hours worked. However, whenever the capital service flows are not proportional to the stock, the measuring of capital service flows is not obvious. The usual thing is to observe the additions to the capital stock —investment— which allows to build measures of the capital stock, but the relevant thing in economic terms is the capital service flow. The behaviour of the productive capacity use rate shows that the moments with a higher economic activity are the moments when there is a high capital use and that the capital use is reduced when the economic activity decreases. The capital stock does not meet the fluctuations of the economic activity easily, but the capital stock use does. Licandro et al. (1996) study the effect of the capital use on the spread mechanism of the technological shocks of the Spanish economy, concluding that both the capital use and the maintenance costs contribute considerably to the spread of aggregated technological shocks.

6.4.1 Total Factor Productivity

In the former section we have discussed the cyclical behaviour of the total factor productivity calculated in the RBC literature standard way, that is, assuming a constant labour share

$$\log(TFP_t) = \log(Y_t) - \alpha \log(K_t) - (1-\alpha)\log(H_t) \tag{25}$$

Figure 35 shows the TFP calculated as above. Alternatively, we can calculate

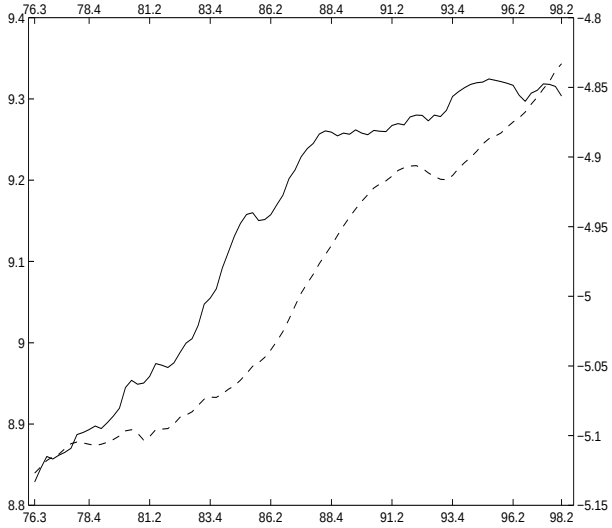
$$\log(TFP_t) = \log(Y_t) - \alpha_t \log(K_t) - (1-\alpha_t)\log(H_t) \tag{26}$$

where $1-\alpha_t$ is calculated according to expression (6). The Solow residual calculated like this is shown in figure 36.

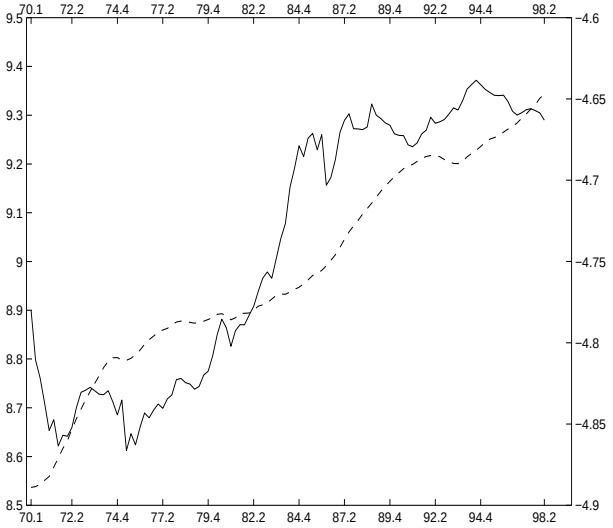
However, the cyclical behaviour of the measure (26) does not differ much from the one pointed out in the former discussion. Table 17 shows the standard deviation of the cyclical component and its correlation with the cyclical component of GDP. We can see that it has a higher volatility than GDP and a negative non-significant correlation.

Another alternative measure for TFP is the one presented in section 3.4. Table 18 shows the standard deviation and the correlation of the TFP growth rate with the GDP growth rate. Although the correlation changes its sign, it is still low; it is significant for the growth rates only in the 1986.1-1994.4 sample.

TFP is usually interpreted as technical progress. However, the measuring of TFP, like the ones presented in this section, can contain important biases. It has already been mentioned that the relevant measure, in terms of the production function, is the capital service flow. In the usual measures of TFP the capital stock is used instead of the service flow. The more the capital use rate includes this service flow, the more procyclically the capital use rate will



35.1: Solow Residual (Hours LFP), right scale.



35.2: Solow Residual (Hours WS), left scale.

Figure 35: Solow Residuals (−) GDP (logs) (−−). 1976.3-1998.2.

	1976.3-1994.4.		1986.1-1994.4.	
	σ	Corr(GDP,TFP)	σ	Corr(GDP,TFP)
GDP	1.0112	1	1.287	1
TFP	1.4766	-0.1362^*	1.746	-0.292^*

Table 17: Standard deviation and correlation with the GDP of the TFP of (26). The correlations that are not statistically different from zero are marked with $*$.

behave than the capital stock, so that the TFP calculated with the capital stock must be less procyclical than if it was calculated with the service flow.

On the other hand, the interpretation of the Solow residual as a measure of the technical progress is based on some assumptions : the fact that the factors are remunerated to their marginal productivities and that the technical progress is labour aumenting. If any of these assumptions is not met, the Solow residual will not measure the technical progress. There is literature that suggests several reasons for this difference between Solow residual and technical progress, Hall (1988) shows that in the presence of imperfect competition in the factor market, the Solow residual is a biased estimation of the parameter of the A_t technological change, and that if we want to obtain a non-biased estimation, a measure of the output elasticity should be used instead of the factor share. Likewise, if the nature of the technical progress implies that the technological changes modify the productivity of the factors in a different way, there would also be an important bias in the Solow residual as a measure of the technical progress. These are two possibilities that would question the interpretation of the Solow residual as a measure of the technological progress. Hulten (2000) reviews a great amount of reasons to consider the Solow residual as a measure of "our ignorance" rather than of the technical progress. Thus, the acyclicity of the Solow residual can be just the result

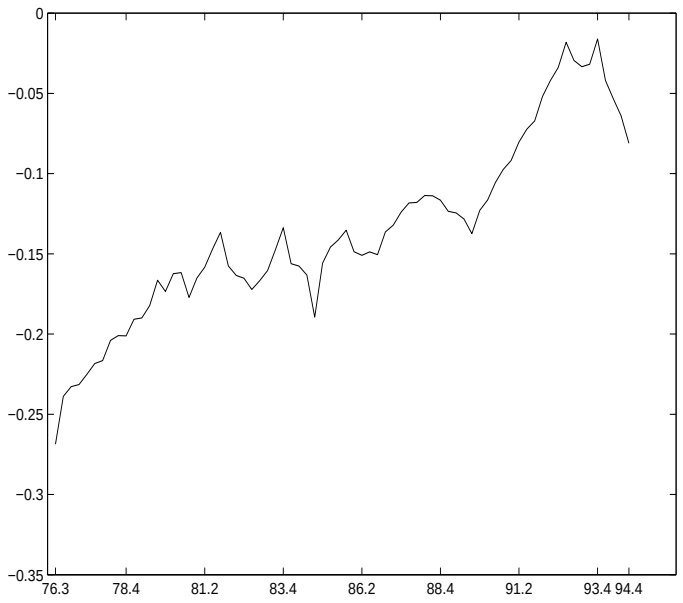


Figure 36: Solow residual calculated according to (26).

	1976.1-1994.4.		1986.1-1994.4.	
	σ	Corr(Δ GDP,Δ TFP)	σ	Corr(ΔGDP,ΔTFP)
ΔGDP	0.5149	1	0.5625	1
ΔTFP	0.5121	0.1183^*	0.3938	0.3009
	σ	Corr(HP(GDP),HP(TFP))	σ	Corr(HP(GDP),HP(TFP))
HP(GDP)	1.0896	1	1.4198	1
HP(TFP)	0.7413	-0.0592^*	0.6054	-0.0167^*

Table 18: Standard deviation and correlation between the cyclical component of GDP and TFP calculated according to (2). The correlations that are not statistically different from zero are marked with $*$.

of a failure to meet the assumptions on which it is built rather than evidence of absence of technological shocks.

6.5 Prices and Wages

The behaviour of the levels of the more general price indexes, the CPI and the implicit price deflator of GDP,is clearly countercyclical and anticipated to the cycle, specially in the second part of the sample. However, the cyclical component of the growth rates of these indexes —inflation— is procyclical and tends to delay the cycle. This behaviour is more obvious in the second subsample. As for this, the behaviour of the Spanish economy coincides with the one documented by Stock and Watson (1999) and other authors for the USA.

The industrial price index has a similar behaviour to the one described for CPI and the deflator of GDP, because it is countercyclical leading the cycle, whereas its growth rate is procyclical delaying the cycle. It shows that the countercyclical behaviour of the prices seems quite consistent and does not depend on the different price series considered.

The behaviour pattern of CPI is repeated for the unitary labour cost index and the average nominal earning per hour, which suggests that most contracts are indexed according to this price index. The inflation rate of the implicit price deflator of GDP is much more volatile than with the rest of prices. The industrial prices are also more volatile than the consumer prices.

On the contrary, the real average earning per hour has an acyclical contemporary behaviour. In the second subsample, the crossed correlations show a 1-year delay in the cyclical change of the real earning, with a positive low correlation. The Baxter-King filter shows a negative correlation between the inflation rate and the real average earning, suggesting that the inflation reduces the real wages. However, this correlation is not the same with the rest of the filters, that do not show correlation between both variables.

The real average earning per hour worked shows a positive but very low correlation with the measure of the average labour productivity calculated with the hours of the Wage Survey. This observation questions the use of the average labour productivity as a measure of the marginal productivity. This practice is based on that, in many models, the marginal and average productivity are proportional. On the other hand, there is still a negative correlation between the average earning and the hours worked (WS), specially in the second subsample. Since the average earning is obtained from the Wage Survey, it is a wage measure in industry and services and may not be a good wage measure in all the economy. Due to this, in table 19 the statistic computation is repeated by using the real wage measure of (16).

Table 19 confirms the countercyclicity of the real wages as well as a strong negative relationship with the hours worked and a positive but low correlation with the average productivity. In Fernández and Montuenga (1997) there is evidence at sectoral level in the same direction. On the other hand, the empiric elasticity of the working hours with relation to the wage is high, almost one. Table 20 shows that the countercyclicity of the real wage is a characteristic of several developed economies, specially European ones.

6.5.1 Alternative Theories

In former sections, we have already commented the difficulties that the models of economic cycle based on the neoclassical model of growth and technology shocks have to reconcile themselves with the evidence presented here. In this section, we discuss some alternative theories to explain such behaviours previously observed.

Real Wage		
	1976.3-1997.2	1986.1-1997.2
Standard Deviation (%)	1.3658	1.6170
Relative Volatility	1.3240	1.2939
Correlation with GDP	−0.5732	−0.6573
Correlation with hours (LFP)	−0.7358	−0.7586
Correlation with average labour productivity	0.3503	0.3058
Elasticity of labour Cov(H,w)/Var(w)	−0.9828	

Table 19: Relative volatility and correlations of the real wage. H-P filter.

Real Wage							
	USA	Canada	Japan	Germany	France	UK	Italy
Standard Deviation (%)	0.90	1.61	2.46	1.12	0.75	1.61	1.93
Relative Volatility	0.51	1.15	1.60	0.66	0.83	1.04	1.13
Correlation with GDP	0.49	-0.25	0.24	-0.10	-0.41	0.46	-0.11
Average Productivity							
Correlation with GDP	0.72	0.64	0.88	0.38		0.55	

Table 20: International comparison of the real wage. H-P filter. Source: Fiorito and Kollintzas (1994).

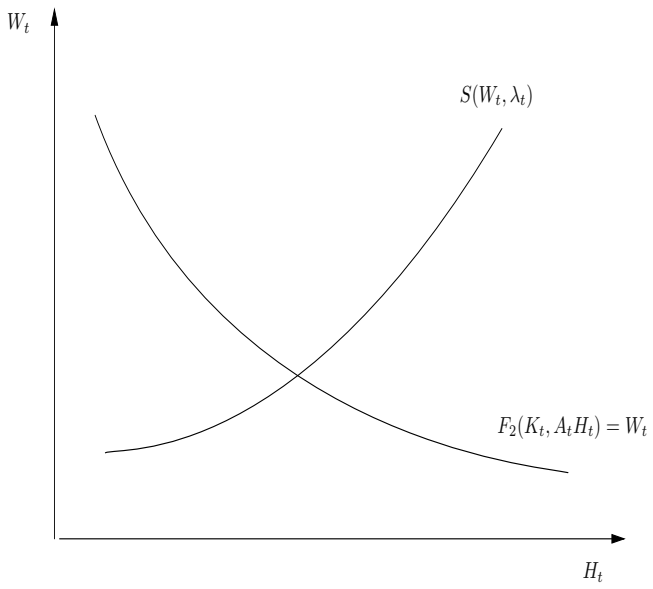


Figure 37: Labour supply and demand.

If we consider neoclassical technologies with labour aumenting technical progress and price accepting firms, in each t moment , the labour demand is given by a function with negative slope, given the K_t capital stock and the state of the technology A_t

$$F_2(K_t, A_t H_t) = W_t$$

that establishes a negative relationship between the amount of hours worked and the real wage, because the marginal productivity is a decreasing one in H_t.

On the other hand, if we assume the existence of a representative agent and time separable preferences over consumption and leisure, in each t the labour supply can be written as follows

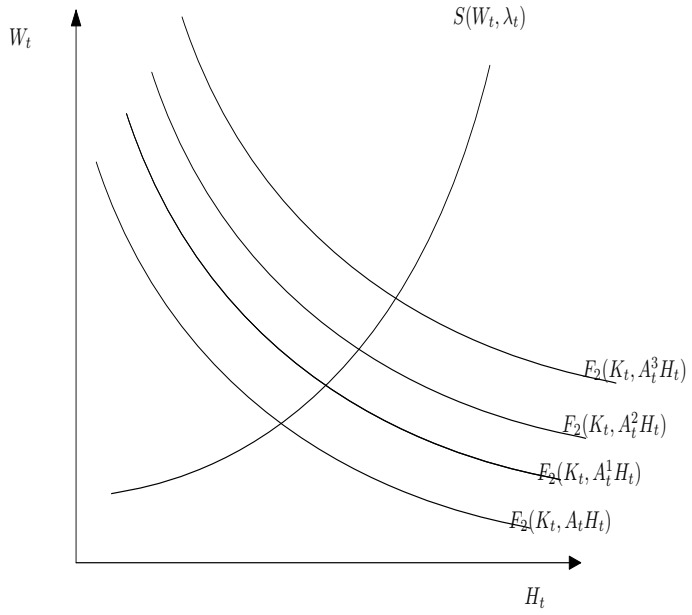
$$H_t = S(W_t, \lambda_t)$$

where λ_t represents the marginal utility of the income in the t period. The S function is an increasing one both in W_t and in λ_t if consumption and leisure are normal goods. Figure 37 represents the labour demand and supply functions of each t moment.

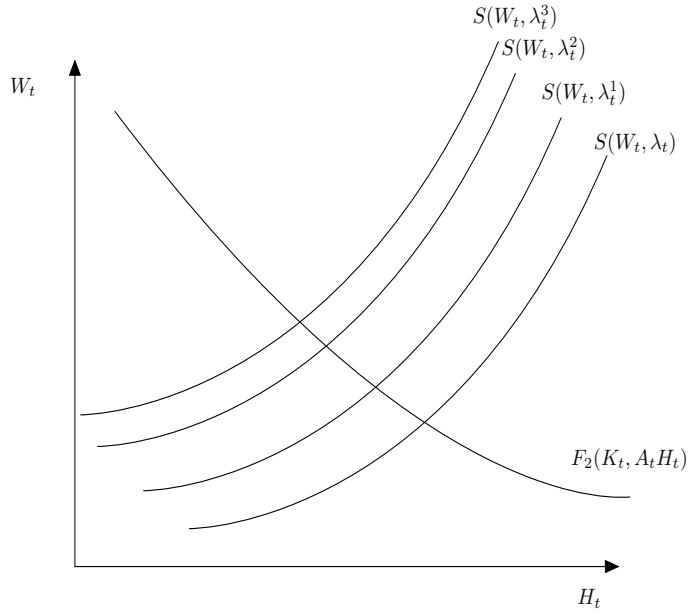
The effects that different shocks can have over the correlation between real wage and hours worked or over the correlation between real wage and output can be considered.

If it is considered that the fluctuations of the economy are governed by stochastic changes in TFP, that is stochastic changes in the A_t variable, such changes would imply labour demand movements that would generate a positive correlation between real wage and employment,as shown in figure 38.1. This is the case in the standard RBC models with technological shocks. This is the reason why considering technological shocks was an alternative to explain the Dunlop-Tarshis observation.

On the contrary, if the fluctuations of the economy are governed by shocks of aggregated demand, given that the capital stock and the state of the technology do not depend on such shocks, the rises or reductions provoked by the shock in output and employment can only be due to changes in the labour supply, which means shifts along the labour demand, that generate a negative correlation between real wage and employment. Figure 38.2 represents



38.1: Technological Shocks.



38.2: Aggregate Demand Shocks.

Figure 38: Effects of different shocks in real wage and employment.

this case. A difficulty in this case is that if the shocks of the demand only affected the marginal utility of the income, consumption would behave countercyclically.

Although RBC models with technological shocks provoke a positive correlation between real wage and salary, they fail to reproduce such a weak correlation as the one observed for the USA. This is the reason why Christiano and Eichenbaum (1992) include the two kinds of shocks and allow the shocks of the aggregated demand also to affect the marginal utility of consumption. For Spain, Licandro and Puch (1997) carry out the same experiment.

On the other hand, Rotemberg and Woodford (1991) suggest a model of imperfect competition in which not only the prices are kept over the marginal cost but the markup behaves countercyclically. In this case, the labour supply is given by

$$F_2(K_t, A_t H_t) = \mu_t W_t$$

The variability of the markup provokes similar changes in the labour demand to those provoked by technological shocks, as shown in figure 39.

Galí (1999), not following the neoclassical model, proposes a model of monopolistic competition, sticky prices and variable labour effort that provokes a null or negative correlation between productivity and hours worked. In this model, technological shocks generate a negative correlation between average productivity and hours, whereas monetary shocks generate a positive correlation between the same variables. Moreover, the monetary authority reacts to technological shocks systematically, so that the effects of both kinds of shocks tend to get cancelled. Since the demand can keep constant or grow very little, less labour is needed to satisfy the demand than before the shock is produced, so the average productivity would increase. Thus, a technological shock causes a negative correlation between average productivity and hours worked. On the contrary, non-technological shocks (monetary ones) will cause a positive correlation between hours and average productivity.

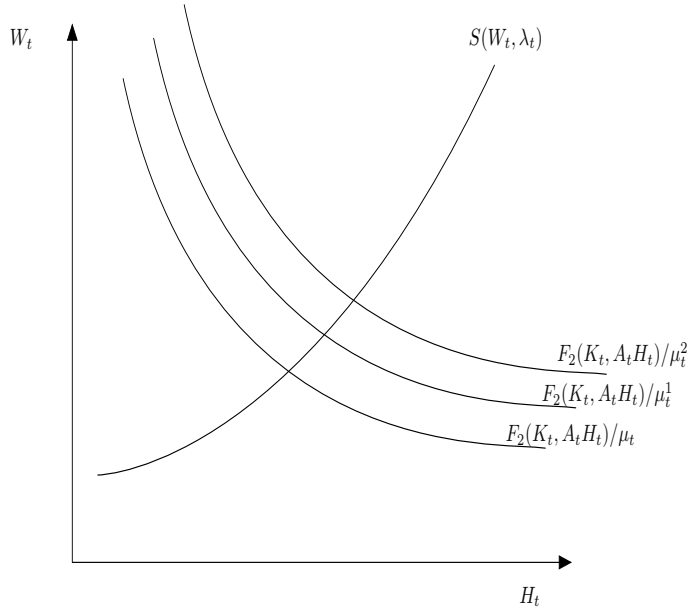


Figure 39: Changes in markup.

Finally, table 21 summarizes several volatilites and correlations observed in the labour market and shows the signs that several theories forecast about them.

Relative volatility	Data	standard RBC	RBC several shocks	Contracts	Sticky prices
Hours worked (H)	1.60	< 1	< 1	≥ 1	
Average Productivity (AP)	1.76	< 1	< 1	< 1	
Correlation with GDP	Data	standard RBC	RBC several shocks	Contracts	Sticky prices
Average Productivity	-0.26	$+$	$+$	$+$	$+$
Hours Worked	0.91	$+$	$+$	$+$	$+$
Wage	-0.65	$+$	$+$	$0/-$	
corr(AP,H)	-0.38	$+$	$+/-$	$+$	$0/-$
corr(AP,Wage)	0.30	1	1	$0/-$	

Table 21: Comparison between several theories forecast about relative volatilities and correlations in labour market. sample 1986.1-1998.2. Hodrick-Prescott Filter.

6.6 Interest rates and share prices

Both the nominal and the real short-term interest rates are procyclical, whereas the long-term interest rate is acyclical. The Madrid Stock Index shows a procyclical behaviour with 1-year delay, but null contemporary correlation with the cycle. A very important feature is the capacity of the interest rates as a leading indicator of the economic cycle. Stock and Watson (1999) report this fact after finding negative high crossed correlations with two or six quarters of lead. In the literature based on autoregresive vectors, this feature has been interpreted as evidence showing the importance of monetary shocks in the economic cycle. A revision of this literature can be found in Christiano et al. (1998). Although it is not so clear that this feature can not be due to real shocks such as the results of Boldrin et al. (1999). Such feature can not be observed with the interest rate series studied.

On the other hand, the leading behaviour shown by the crossed correlations of Madrid Stock Index with the output and the forecasting capacity over GDP are consistent with the fact that the share prices reflects the expectations of the participants in the market on future earnings.

6.7 Monetary aggregated

In this section we include two measures of the amount of money in the economy that attract the attention of the central banks in their attempt to control such amount of money. On the one hand, there is a monetary base under the short-term control of the central bank, and, on the other, there is a wider aggregated monetary, M2.

M2 is clearly procyclical and contemporary with the cycle, showing a stronger procyclicity in real terms than in nominal ones. The growth rate of M2 moves with a delay of about a year with the cycle. On the contrary, both the real and nominal monetary base is acyclical. On the other hand, M2 and its growth rate show forecasting capacity over the cyclical component of GDP, specially if all the sample or the first part of it is taken. In the second subsample, F statistics show forecasting capacity in the two directions.

These observations coincide with RBC literature in stating that monetary aggregated with aspects of financial intermediation show a higher correlation with the output. In this case, M2 includes the cash in hands of the public, the deposits at call of households and non-financial firms of the economy, whereas the monetary base is the amount of cash in the hands of the public and the legal reserves. The higher correlation of M2 with the output must be due to a higher correlation of the deposits at call and the saving capital deposits with the output. Moreover, the forecasting capacity in both directions between M2 and the output seems to confirm the endogenous nature of the financial intermediation system. The latter consideration indicates the need that the theories about fluctuations include aspects of financial intermediation if we want to explain the positive correlation between money and output.

On the other hand, the null correlation between the monetary base and the real output suggests that the monetary policy does not have short-term effects on the real output either.

6.8 Profits and factor shares

Table 22 presents the standard deviations and the correlations with the output of the capital income and the labour share —Computed following expressions (5) and (6) respectively—. The volatility of the labour share is a little smaller than the volatility of the output, whereas

	1972.1-1997.4		1972.1-1985.4		1986.1-1997.4	
Serie	s.d.	Corr.	s.d.	Corr.	s.d.	Corr.
Output	1.2086	1	1.1545	1	1.2754	1
Capital Income	3.1386	0.440	3.1597	0.420	3.1433	0.459
Labour Share	0.7458	-0.119^*	0.5957	0.180^*	0.8965	-0.333

Table 22: Statistics of the cyclical component of the capital income and the labour share. The correlations that are not statistically different from zero are marked with $*$.

the capital income are much more volatile. The capital income are slightly procyclical in any of the samples considered. On the contrary, the labour share is acyclical if all the sample or the 1972.2-1985.4 sample is considered and becomes countercyclical in the 1986.1-1997.4 sample.

Boldrin and Horvath (1995) show that to consider a non-competitive mechanism, like contractual agreements between employees and employers, in the market labour, causes a different cyclical behaviour of the benefits and labour shares from the one generated by RBC standard models. In particular, contracts increase the volatility of the benefits and tend to create a negative correlation between the labour share and the output. The evidence in table 22 is compatible with such interpretation.

Appendices

A Data and Sources

A.1 Components of GDP

- ***Output*** (**GDP**)= Gross Domestic Product, billions of 1986 pts. 1970.1-1998.2. Quarterly National Accounting (QNA). Instituto Nacional de Estadística (INE).
- ***Aggregate Consumption*** (**CON**)= Private Consumption, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Durables Consumption*** (**CD**)= Private Consumption in durables goods, billions of 1986 pts. 1970.1-1997.4. Estrada and Sebastián (1993).
- ***Non Durables Consumption*** (**CND**)= Private Consumption in Non Durables goods, billions of 1986 pts. 1970.1-1997.4. Estrada and Sebastián (1993).
- ***Government Expenditure*** (**G**)= Current Expenditure of Government, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Gross Fixed Investment*** (**FBCF**)= Public and Private Gross Fixed Investment, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Change in Inventories*** (**EXT**)= Change in Business Inventories, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Investment*** (**I**)= FBCF+EXT.
- ***Exports*** (**X**)= Exports of goods and services, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Imports*** (**M**)= Imports of goods and services, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Net Exports*** (**XN**)= (X-M)/GDP. 1970.1-1998.2. QNA, INE.

A.2 Sectoral Employment and output

- ***Agriculture GVA*** (**GVAag**)= Gross Value Added in Agriculture, billions of 1986 pts. 1970.1-1998.2. QNA, INE.
- ***Industry GVA*** (**GVAin**)= Idem for Industry.
- ***Construction GVA*** (**GVAco**)= Idem for Construction.
- ***Non Sale Services GVA*** (**GVAsnv**)= Idem for Non Sale Services.
- ***Sale Services GVA*** (**GVAsv**)= Idem for Sale Services.
- ***Agricultural Employment*** (**EMPa**)= Employment in Agriculture, thousands of people. 1964.2-1998.2. García-Perea (1991) and Labour Force Survey (LFS), INE.
- ***Industrial Employment*** (**EMPin**)= Idem for Industry.
- ***Construction Employment*** (**EMPc**)= Idem for Construction.
- ***Services Employment*** (**EMPs**)= Idem for services.
- ***Agriculture, Livestock and Fishing Employment*** (**EMPag**)= Employment in Agriculture, Livestock, Forestry, Hunting and Fishing, thousands of people. 1976.3-1992.4. LFS, INE.

- ***Energy and Water Employment*** (**EMPen**)= Idem for Energy and Water Sector.
- ***Mining and Chemical Employment*** (**EMPmin**)= Idem for non-energetic mining and chemical byproducts.
- ***Metal and Precision Employment*** (**EMPitra**)= Idem for metal-processing and precision engineering industry.
- ***Other Manufacturing Employment*** (**EMPima**)= Idem for other Manufacturing sectors.
- ***Construction Employment*** (**EMPco**)= Idem for Construction.
- ***Commerce and Hotel Employment*** (**EMPcom**)= Idem for Commerce and Hotel services.
- ***Communication and Transport Employment*** (**EMPtra**)= Idem for Communication and Transport.
- ***Finance and Insurance Employment*** (**EMPfin**)= Idem for Finance and Insurance services.
- ***Others Services Employment*** (**EMPser**)= Idem for other services.
- ***General Industrial Production Index*** (**IPIg**)= General Industrial Production Index, 1990=100, 1975.1-1998.2. INE.
- ***Energy and Water IPI*** (**IPIen**)= Idem for Energy and Water.
- ***Mining and Chemical IPI*** (**IPIex**)= Idem for non-energetic mining and chemical byproducts.
- ***Metal and Precision IPI*** (**IPItr**)= Idem for metal-processing and precision engineering industry.
- ***Other Manufacturing IPI*** (**IPIot**)= Idem for Other Manufacturing.

A.3 Aggregate Employment and Productivity

- ***Labour Force*** (**PA**)= People aged 16 and over who are engaged in the production of goods and services or available for this production. 1964.2-1998.3. García-Perea (1991) and LFS, INE.
- ***Employment*** (**EMP**)= Anyone aged 16 years or over who during the reference week has been working for at least one hour in return for a pay in cash or kind, or who having a job, was temporarily absent on sick leave, holidays, etc. 1964.2-1998.3. García-Perea (1991) and LFS, INE.
- ***Government Employment*** (**ASPU**)= Employees on Government Administration. 1976.3-1998.3. LFS, INE.
- ***Activity Rate*** (**TA**)= PA/Population > 16. 1976.3-1998.3. LFS, INE.
- ***Unemployment Rate*** (**UT**)= Unemployment/PA. 1964.2-1998.3. García-Perea (1991) LFS, INE.
- ***Average Hours Wage-earners*** (**HWes**)= Monthly Average Hours Worked by Wage-earners. 1970.1-1998.2. Carbajo and García-Perea (1987) and Industry and Services Wages Survey (ES), INE.
- ***Average Hours Employees*** (**HWepa**)= Weekly Average Hours Worked by Employees. 1976.3-1998.3. LFS, INE.

- ***Total Hours Wage-earners*** (**HTes**)= 3× HWes × Wage-earners. 1970.1-1998.2.
- ***Total Hours Employees*** (**HTepa**)= 12× HWepa × Employees. 1976.3-1998.3.
- ***Labour Productivity Wage-earners*** (**LPHes**)= GDP/HTes. 1970.1-1998.2.
- ***Labour Productivity Employees*** (**LPHepa**)= GDP/HTepa. 1976.3-1998.3.
- ***Capacity Utilization*** (**UCP**)= Capacity Utilization Rate. 1965.1-1998.2. Economic Situation Survey. Ministerio de industria y energía.
- ***Total Factor Productivity (es)*** (**TFes**)= $\log(\text{GDP}) - 0.6529 \times \log(\text{HTes}) - 0.3471 \times \log(\text{K})$. Where K is a capital stock serie computed following $\text{K}_{t+1} = \text{FBCF}_t + (1 - 0.0161)\text{K}_t$ and K_0 was equal to capital stock of 1969 in Corrales and Taguas (1990) at 1986 pesetas. The factor shares and depreciation rate are from Licandro and Puch (1997). 1970.1-1998.2.
- ***Total Factor Productivity (epa)*** (**TFepa**)= $\log(\text{GDP}) - 0.6529 \times \log(\text{HTepa}) - 0.3471 \times \log(\text{K})$. 1976.3-1998.2.
- ***Vacancies*** (**VAC**)=Vacancies. 1977.1-1997.4. OCDE Statistical Compendium, ed. 1 1998.

A.4 Prices and Wages

- ***Consumer Price Index*** (**CPI**)= Consumer Price Index quarter average. 1992=100. 1961.1-1998.3. INE.
- ***Producer Price Index*** (**PPI**)= Index which measures the monthly price evolution of industrial products manufactured and sold on the domestic market, at the first commercialization stage, that is ex-works prices obtained by industrial establishments' transactions, not counting transport and commercialization costs nor value added turnovers. Quarter average. 1990=100. 1975.1-1998.3. INE.
- ***GDP Price Deflactor*** (**DGDP**)= GDP Price Deflactor. 1970.1-1998.2. QNA. INE.
- ***Inflation Rate (IPC)*** ($\Delta_{\mathbf{cpi}}$)= $\log(\text{CPI}_t) - \log(\text{CPI}_{t-1})$. 1961.1-1998.3.
- ***Inflation Rate (IPRI)*** ($\Delta_{\mathbf{ipri}}$)= $\log(\text{PPI}_t) - \log(\text{PPI}_{t-1})$. 1975.1-1998.3.
- ***Inflation Rate (DGDP)***($\Delta_{\mathbf{dgdp}}$)= $\log(\text{DGDP}_t) - \log(\text{DGDP}_{t-1})$. 1970.1-1998.2.
- ***Unitary Labour Cost Index*** (**ULCI**)= Unitary Labour Cost Index. 1965.1-1998.2. Banco de Espa na.
- ***Average Earnings per Hour Wage-earners*** (**AEH**)= earnings are made up of wages in cash and in kind, for time worked or work completed, as well as payments for non-worked periods such as vacations and holidays. Earnings include basic wages and fringe benefits (personal, jobs), etc. They are considered in gross terms, i.e. before deduction of tax and Social Security contributions charged to the workers. 1981.1-1998.2. ES, INE.
- ***Real Average Earnings per Hour*** (**RAEH**)= GANH/IPC. 1981.1-1998.2.
- ***ULCI Growth Rate*** ($\Delta_{\mathbf{iclu}}$)= $\log(\text{ICLU}_t) - \log(\text{ICLU}_{t-1})$. 1965.1-1998.2.
- ***AEH Growth Rate*** ($\Delta_{\mathbf{ganh}}$)= $\log(\text{GANH}_t) - \log(\text{GANH}_{t-1})$. 1981.1-1998.2.
- ***RAE Growth Rate*** ($\Delta_{\mathbf{ganhr}}$)= $\log(\text{GANHR}_t) - \log(\text{GANHR}_{t-1})$. 1981.1-1998.2.

A.5 Interest Rates and Stock Prices

- ***Nominal Interest Rate 3 month (INT3)***= Nominal Interest Rate 3 month. Interbank market. 1977.1-1998.3. Banco de Espa na.
- ***Real Nominal Interest Rate 3 month (INT3r)***=$\text{INT3}_t - \text{DGDP}_{t+1}$.1977.2-1998.3.
- ***Nominal Treasury Bonds 10 year (INT10)***=Nominal Treasury Bonds 10 year. 1987.4-1998.3. Banco de Espa na.
- ***Madrid General Stock Market Index (BOLSA)***= Madrid General Stock Market Index. 1985=100. 1985.1-1998.3. Banco de Espa na.

A.6 Money

- ***M2 (M2)***= Aggregate Money M2. 1970.1-1998.3. Banco de Espa na.
- ***Monetary Base (BM)***= Monetary Base. 1970.1-1998.3. Banco de Espa na.
- ***Real M2 (M2)***= M2/DGDP. 1970.1-1998.3.
- ***Real Monetary Base (BM)***= BM/DGDP. 1970.1-1998.3.
- ***M2 Growth Rate (Δ_{m2})***= $\log(\text{M2}_t) - \log(\text{M2}_{t-1})$. 1970.2-1998.3.
- ***Monetary Base Growth Rate (Δ_{bm})***= $\log(\text{BM}_t) - \log(\text{BM}_{t-1})$. 1970.2-1998.3.

B Tables

Table 23: Descriptive Statistics for First Differences of Series. 1970-1998.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l)											$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
			l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5		
Components of GDP															
GDP	0.617	1	0.35 (3.85)	0.48 (5.60)	0.56 (7.00)	0.67 (9.39)	0.85 (17.13)	1.00 (−)	0.85 (17.13)	0.67 (9.39)	0.56 (7.00)	0.48 (5.60)	0.35 (3.85)	-	-
Aggregate Consumption	0.707	1.14	0.35 (3.83)	0.43 (4.94)	0.57 (7.17)	0.71 (10.49)	0.81 (14.60)	0.83 (15.55)	0.74 (11.46)	0.62 (8.17)	0.51 (6.10)	0.44 (4.96)	0.40 (4.52)	4.95	0.79
Durables Consumption	2.099	3.40	0.39 (4.31)	0.44 (4.99)	0.55 (6.76)	0.63 (8.48)	0.68 (9.51)	0.62 (8.16)	0.55 (6.80)	0.41 (4.68)	0.24 (2.56)	0.09 (0.94)	0.05 (0.49)	2.69	4.43
Non Durables Consumption	0.637	1.03	0.27 (2.86)	0.35 (3.85)	0.47 (5.53)	0.61 (7.97)	0.72 (10.86)	0.77 (12.74)	0.69 (9.99)	0.60 (7.71)	0.53 (6.50)	0.51 (6.10)	0.49 (5.76)	2.81	1.12
Government Expenditure	0.764	1.23	−0.03 (−0.28)	0.00 (0.04)	0.02 (0.21)	0.11 (1.17)	0.28 (3.04)	0.45 (5.21)	0.37 (4.14)	0.30 (3.31)	0.32 (3.46)	0.36 (3.90)	0.34 (3.63)	1.47	1.06
Gross Fixed Investment	1.953	3.16	0.23 (2.36)	0.33 (3.54)	0.44 (5.05)	0.57 (7.20)	0.70 (10.28)	0.78 (12.99)	0.71 (10.46)	0.61 (7.91)	0.50 (5.94)	0.37 (4.03)	0.24 (2.57)	1.73	0.61
Change in Inventories	0.321	0.52	0.01 (0.11)	0.04 (0.41)	0.03 (0.30)	0.07 (0.73)	0.25 (2.64)	0.42 (4.88)	0.35 (3.93)	0.21 (2.25)	0.15 (1.52)	0.10 (1.06)	−0.02 (−0.20)	1.47	3.69
Investment	2.252	3.64	0.19 (2.03)	0.30 (3.18)	0.39 (4.33)	0.50 (6.03)	0.67 (9.41)	0.80 (13.88)	0.70 (10.31)	0.56 (7.06)	0.46 (5.32)	0.35 (3.79)	0.21 (2.17)	0.20	0.67
Exports	1.445	2.34	0.18 (1.90)	0.22 (2.34)	0.18 (1.94)	0.14 (1.44)	0.12 (1.27)	0.13 (1.34)	0.03 (0.29)	−0.09 (−0.93)	−0.17 (−1.74)	−0.22 (−2.27)	−0.26 (−2.80)	0.75	0.88
Imports	2.324	3.76	0.20 (2.04)	0.25 (2.63)	0.39 (4.32)	0.53 (6.45)	0.61 (7.91)	0.60 (7.80)	0.53 (6.44)	0.41 (4.61)	0.27 (2.83)	0.13 (1.33)	0.10 (0.99)	3.58	3.88
Net Exports	0.473	0.77	−0.07 (−0.68)	−0.10 (−1.00)	−0.23 (−2.49)	−0.39 (−4.32)	−0.47 (−5.53)	−0.47 (−5.55)	−0.46 (−5.33)	−0.42 (−4.74)	−0.34 (−3.71)	−0.25 (−2.69)	−0.24 (−2.56)	3.56	3.47
Sectoral Employment and Output															
Agriculture GVA	2.379	3.89	0.07 (0.72)	0.04 (0.38)	0.04 (0.41)	0.08 (0.82)	0.15 (1.55)	0.19 (2.09)	0.13 (1.42)	0.06 (0.61)	0.03 (0.35)	0.07 (0.77)	0.14 (1.41)	1.31	3.18
Industry GVA	1.023	1.67	0.34 (3.67)	0.43 (4.98)	0.52 (6.36)	0.63 (8.57)	0.76 (12.43)	0.85 (16.76)	0.73 (11.13)	0.57 (7.31)	0.46 (5.34)	0.35 (3.83)	0.19 (2.02)	0.65	3.35
Construction GVA	1.508	2.47	0.26 (2.78)	0.37 (4.14)	0.45 (5.17)	0.52 (6.34)	0.61 (8.01)	0.70 (10.20)	0.65 (9.00)	0.56 (7.12)	0.50 (5.94)	0.43 (4.90)	0.31 (3.37)	1.38	1.04
Non Sale Services GVA	0.547	0.89	−0.12 (−1.27)	−0.04 (−0.42)	0.07 (0.77)	0.20 (2.18)	0.33 (3.71)	0.47 (5.64)	0.47 (5.53)	0.47 (5.57)	0.48 (5.63)	0.50 (6.01)	0.50 (6.01)	1.03	2.21
Sale Services GVA	0.466	0.76	0.43 (4.95)	0.55 (6.90)	0.63 (8.35)	0.68 (9.81)	0.78 (13.08)	0.86 (17.38)	0.74 (11.38)	0.60 (7.92)	0.50 (6.00)	0.42 (4.74)	0.34 (3.72)	1.34	1.28
Agricultural Employment	1.378	2.82	0.10 (0.90)	0.11 (1.00)	0.10 (0.93)	0.13 (1.22)	0.11 (1.06)	0.12 (1.08)	0.07 (0.60)	0.00 (0.03)	−0.07 (−0.64)	−0.03 (−0.31)	−0.05 (−0.44)	0.16	0.70
Industrial Employment	1.168	2.39	0.22 (2.05)	0.31 (2.91)	0.43 (4.29)	0.54 (5.85)	0.59 (6.77)	0.59 (6.76)	0.65 (7.92)	0.64 (7.52)	0.58 (6.38)	0.40 (3.90)	0.34 (3.22)	0.59	5.36
Construction Employment	2.286	4.67	0.31 (2.93)	0.39 (3.80)	0.44 (4.45)	0.54 (5.81)	0.59 (6.74)	0.62 (7.21)	0.60 (6.96)	0.53 (5.63)	0.50 (5.22)	0.43 (4.34)	0.37 (3.61)	1.59	2.95
Services Employment	0.740	1.51	0.42 (4.13)	0.50 (5.14)	0.54 (5.74)	0.55 (6.06)	0.57 (6.33)	0.59 (6.81)	0.56 (6.20)	0.49 (5.09)	0.47 (4.82)	0.43 (4.30)	0.39 (3.80)	2.13	2.11
Agriculture, Livestock and Fishing Emp.	1.510	2.95	0.03 (0.22)	0.10 (0.74)	0.06 (0.49)	0.08 (0.60)	0.09 (0.68)	0.09 (0.69)	0.08 (0.67)	−0.01 (−0.06)	−0.10 (−0.75)	−0.04 (−0.30)	−0.04 (−0.29)	0.10	0.79
Energy and Water Employment	2.672	5.23	0.04 (0.34)	0.02 (0.19)	0.03 (0.23)	0.01 (0.10)	0.00 (0.03)	0.07 (0.59)	0.09 (0.72)	0.14 (1.08)	0.12 (0.91)	−0.01 (−0.06)	−0.02 (−0.13)	0.66	0.64
Mining and Chemical Employment	1.811	3.54	0.18 (1.36)	0.10 (0.77)	0.17 (1.34)	0.17 (1.33)	0.19 (1.54)	0.18 (1.48)	0.29 (2.37)	0.34 (2.85)	0.36 (3.02)	0.30 (2.41)	0.28 (2.18)	0.78	1.78
Metal and Precision Employment	2.004	3.92	0.15 (1.14)	0.17 (1.32)	0.24 (1.91)	0.28 (2.24)	0.30 (2.47)	0.42 (3.63)	0.42 (3.70)	0.40 (3.37)	0.38 (3.14)	0.34 (2.78)	0.31 (2.49)	0.22	3.56
Other Manufacturing Employment	1.086	2.12	0.39 (3.24)	0.49 (4.28)	0.51 (4.65)	0.50 (4.49)	0.58 (5.66)	0.58 (5.71)	0.56 (5.37)	0.52 (4.74)	0.52 (4.72)	0.42 (3.54)	0.38 (3.18)	1.10	4.07
Construction Employment	2.201	4.31	0.35 (2.88)	0.42 (3.50)	0.51 (4.54)	0.63 (6.38)	0.66 (6.92)	0.65 (6.78)	0.64 (6.49)	0.55 (5.20)	0.53 (4.84)	0.48 (4.17)	0.49 (4.32)	2.76	1.70
Commerce and Hotel Employment	1.148	2.25	0.43 (3.58)	0.53 (4.86)	0.48 (4.27)	0.50 (4.54)	0.51 (4.70)	0.56 (5.33)	0.52 (4.77)	0.37 (3.12)	0.41 (3.44)	0.38 (3.13)	0.31 (2.50)	2.52	1.70
Communication and Transport Employment	1.608	3.15	0.12 (0.91)	0.06 (0.48)	0.20 (1.58)	0.26 (2.14)	0.25 (2.05)	0.25 (2.05)	0.20 (1.57)	0.19 (1.51)	0.10 (0.79)	0.11 (0.87)	0.18 (1.42)	0.94	0.67

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Finance and Insurance Employment	2.274	4.45	0.24 (1.91)	0.36 (2.96)	0.32 (2.63)	0.24 (1.89)	0.35 (2.98)	0.35 (3.01)	0.29 (2.43)	0.22 (1.78)	0.25 (1.96)	0.26 (2.04)	0.10 (0.73)	1.98	1.66
Others Services Employment	0.922	1.80	0.26 (2.04)	0.29 (2.31)	0.33 (2.67)	0.29 (2.34)	0.24 (1.96)	0.31 (2.59)	0.27 (2.25)	0.30 (2.42)	0.31 (2.49)	0.16 (1.28)	0.19 (1.47)	0.65	2.40
General Industrial Production Index	3.930	8.09	0.07 (0.64)	0.07 (0.65)	0.25 (2.46)	0.28 (2.71)	0.26 (2.60)	0.39 (4.05)	0.31 (3.13)	0.24 (2.34)	0.16 (1.53)	0.00 (−0.04)	0.01 (0.13)	1.79	4.01
Energy and Water IPI	2.554	5.26	−0.02 (−0.21)	−0.02 (−0.21)	−0.05 (−0.50)	0.02 (0.17)	0.03 (0.32)	0.02 (0.15)	0.05 (0.51)	0.03 (0.33)	−0.01 (−0.08)	−0.12 (−1.12)	−0.09 (−0.85)	1.28	0.68
Mining and Chemical IPI	2.192	4.51	−0.05 (−0.45)	−0.03 (−0.24)	0.19 (1.79)	0.21 (1.98)	0.14 (1.34)	0.13 (1.24)	0.17 (1.59)	0.06 (0.53)	−0.03 (−0.33)	−0.11 (−1.00)	−0.06 (−0.52)	2.19	1.45
Metal and Precision IPI	3.930	8.09	0.07 (0.64)	0.07 (0.65)	0.25 (2.46)	0.28 (2.71)	0.26 (2.60)	0.39 (4.05)	0.31 (3.13)	0.24 (2.34)	0.16 (1.53)	0.00 (−0.04)	0.01 (0.13)	1.79	4.01
Other Manufacturing IPI	2.136	4.40	0.05 (0.49)	0.10 (0.97)	0.26 (2.56)	0.25 (2.48)	0.18 (1.70)	0.12 (1.18)	0.13 (1.22)	0.06 (0.52)	−0.05 (−0.45)	−0.09 (−0.82)	−0.12 (−1.09)	1.92	1.85
Aggregate Employment and Productivity															
Labour Force	0.446	0.73	0.17 (1.83)	0.18 (1.85)	0.26 (2.82)	0.28 (2.99)	0.35 (3.87)	0.26 (2.83)	0.30 (3.27)	0.26 (2.87)	0.27 (2.86)	0.14 (1.49)	0.16 (1.67)	1.01	4.35
Employment	0.655	1.07	0.31 (3.38)	0.40 (4.50)	0.48 (5.68)	0.56 (7.05)	0.60 (7.87)	0.62 (8.38)	0.63 (8.46)	0.58 (7.45)	0.53 (6.56)	0.44 (5.01)	0.37 (4.08)	1.33	1.62
Government Employment	1.587	3.24	−0.05 (−0.47)	−0.09 (−0.84)	−0.07 (−0.60)	−0.06 (−0.59)	−0.08 (−0.74)	0.05 (0.44)	0.09 (0.86)	0.09 (0.80)	0.09 (0.85)	0.11 (1.04)	0.17 (1.50)	1.43	0.52
Activity Rate	0.284	0.58	0.34 (3.26)	0.38 (3.69)	0.44 (4.50)	0.45 (4.53)	0.41 (4.11)	0.36 (3.58)	0.30 (2.86)	0.15 (1.37)	0.19 (1.71)	0.18 (1.60)	0.20 (1.86)	2.19	2.87
Unemployment Rate	4.199	6.84	0.06 (0.59)	0.03 (0.28)	−0.02 (−0.21)	−0.15 (−1.54)	−0.16 (−1.67)	−0.21 (−2.21)	−0.20 (−2.19)	−0.19 (−1.97)	−0.18 (−1.92)	−0.15 (−1.54)	−0.12 (−1.24)	1.71	0.41
Average Hours Wage-earners	0.868	1.41	0.04 (0.41)	0.05 (0.53)	0.03 (0.31)	0.02 (0.24)	0.01 (0.07)	−0.01 (−0.12)	0.01 (0.08)	−0.05 (−0.55)	0.03 (0.34)	0.01 (0.05)	−0.05 (−0.49)	0.19	0.94
Average Hours Employees	0.533	1.09	0.11 (0.97)	0.10 (0.86)	0.16 (1.48)	0.10 (0.87)	0.07 (0.65)	0.13 (1.24)	0.15 (1.37)	0.08 (0.70)	0.01 (0.07)	−0.01 (−0.07)	−0.01 (−0.12)	0.57	0.57
Total Hours Wage-earners	1.337	2.18	0.32 (3.45)	0.36 (4.03)	0.39 (4.41)	0.41 (4.76)	0.43 (4.93)	0.42 (4.85)	0.40 (4.59)	0.30 (3.34)	0.33 (3.62)	0.27 (2.90)	0.19 (2.02)	0.68	2.31
Total Hours Employees	0.916	1.87	0.39 (3.82)	0.45 (4.49)	0.55 (5.95)	0.58 (6.54)	0.61 (7.06)	0.65 (7.85)	0.63 (7.50)	0.56 (6.19)	0.49 (5.07)	0.41 (4.06)	0.34 (3.29)	1.17	1.09
Labour Productivity Wage-earners	2.512	4.09	−0.09 (−0.92)	−0.04 (−0.36)	−0.13 (−1.36)	−0.06 (−0.68)	−0.05 (−0.52)	0.06 (0.67)	0.00 (0.01)	0.00 (−0.04)	−0.02 (−0.25)	−0.05 (−0.53)	0.04 (0.41)	2.11	0.69
Labour Productivity Employees	3.367	6.88	−0.03 (−0.27)	0.00 (−0.02)	−0.13 (−1.17)	−0.08 (−0.71)	−0.01 (−0.09)	0.02 (0.19)	−0.10 (−0.96)	−0.09 (−0.79)	−0.03 (−0.24)	0.01 (0.11)	−0.06 (−0.54)	0.86	1.00
Capacity Utilization	1.761	2.87	0.12 (1.24)	0.15 (1.62)	0.28 (2.98)	0.30 (3.31)	0.20 (2.17)	0.18 (1.93)	0.13 (1.36)	0.11 (1.18)	−0.03 (−0.31)	−0.18 (−1.86)	−0.17 (−1.72)	2.32	3.32
Total Factor Productivity (epa)	0.477	0.98	0.02 (0.18)	0.09 (0.85)	−0.04 (−0.39)	−0.06 (−0.56)	0.11 (1.01)	0.21 (1.94)	0.00 (−0.04)	−0.17 (−1.60)	−0.15 (−1.42)	−0.08 (−0.74)	−0.17 (−1.57)	0.72	3.04
Total Factor Productivity (es)	0.873	1.42	−0.23 (−2.41)	−0.20 (−2.12)	−0.17 (−1.77)	−0.12 (−1.22)	0.00 (−0.01)	0.11 (1.17)	0.01 (0.14)	−0.03 (−0.31)	−0.15 (−1.57)	−0.16 (−1.63)	−0.18 (−1.84)	1.03	1.55
Vacancies	13.206	26.84	0.21 (1.87)	0.09 (0.77)	0.11 (1.01)	0.14 (1.30)	0.15 (1.36)	0.10 (0.88)	0.12 (1.11)	0.14 (1.26)	0.11 (0.97)	0.04 (0.38)	0.03 (0.22)	1.57	0.33
Prices and Wages															
Consumer Price Index	1.456	2.37	−0.32 (−3.54)	−0.30 (−3.20)	−0.24 (−2.60)	−0.22 (−2.40)	−0.20 (−2.17)	−0.17 (−1.84)	−0.12 (−1.25)	−0.03 (−0.36)	0.00 (0.01)	0.01 (0.09)	0.04 (0.45)	0.37	1.48
Producer Price Index	1.579	3.25	−0.42 (−4.35)	−0.44 (−4.55)	−0.39 (−3.92)	−0.34 (−3.40)	−0.29 (−2.92)	−0.28 (−2.84)	−0.30 (−2.99)	−0.28 (−2.76)	−0.27 (−2.64)	−0.28 (−2.73)	−0.26 (−2.54)	2.88	1.05
GDP Price Deflactor	1.337	2.18	−0.33 (−3.56)	−0.33 (−3.62)	−0.25 (−2.66)	−0.18 (−1.94)	−0.17 (−1.81)	−0.19 (−1.99)	−0.10 (−1.00)	0.02 (0.16)	0.07 (0.69)	0.07 (0.74)	0.11 (1.14)	1.37	2.79
Inflation Rate (CPI)	1.043	1.70	0.03 (0.26)	0.04 (0.45)	0.07 (0.71)	0.02 (0.23)	0.03 (0.28)	0.03 (0.37)	0.07 (0.74)	0.10 (1.10)	0.05 (0.49)	0.00 (0.03)	0.05 (0.49)	0.14	1.48
Inflation Rate (PPI)	0.627	1.29	−0.07 (−0.67)	−0.05 (−0.48)	0.12 (1.12)	0.11 (1.03)	0.10 (0.98)	0.02 (0.15)	−0.06 (−0.56)	0.00 (0.05)	0.00 (0.02)	−0.05 (−0.48)	0.03 (0.27)	2.57	1.04
Inflation Rate (DGDP)	29.265	47.66	0.01 (0.08)	−0.04 (−0.44)	0.14 (1.49)	0.14 (1.45)	0.05 (0.57)	−0.02 (−0.18)	0.14 (1.52)	0.18 (1.94)	0.09 (0.97)	−0.01 (−0.08)	0.07 (0.72)	1.34	2.44
Unitary Labour Cost Index	1.605	2.61	−0.31 (−3.30)	−0.28 (−3.07)	−0.27 (−2.91)	−0.25 (−2.73)	−0.23 (−2.46)	−0.17 (−1.83)	−0.07 (−0.74)	0.04 (0.43)	0.14 (1.49)	0.21 (2.27)	0.28 (3.02)	1.77	4.86

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are H_0 : x_t show no Granger causality to y_t y H_0 : y_t show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Average Earnings per Hour	1.533	3.32	−0.07 (−0.56)	−0.10 (−0.79)	−0.15 (−1.21)	−0.11 (−0.88)	−0.10 (−0.85)	−0.14 (−1.17)	−0.14 (−1.18)	−0.02 (−0.16)	−0.10 (−0.81)	0.01 (0.09)	0.05 (0.40)	0.13	1.85
Real Average Earnings per Hour	1.257	2.72	−0.02 (−0.14)	−0.04 (−0.31)	−0.06 (−0.48)	0.00 (−0.03)	0.00 (0.03)	−0.02 (−0.15)	−0.04 (−0.35)	0.07 (0.53)	−0.06 (−0.46)	0.07 (0.58)	0.07 (0.57)	0.11	1.57
ULCI Growth Rate	0.559	0.91	0.08 (0.88)	0.11 (1.10)	0.04 (0.47)	0.05 (0.51)	0.06 (0.59)	0.13 (1.41)	0.29 (3.19)	0.31 (3.46)	0.29 (3.14)	0.20 (2.14)	0.19 (2.01)	1.60	4.19
AEH Growth Rate	2.544	5.50	0.00 (0.03)	−0.03 (−0.24)	−0.09 (−0.72)	−0.03 (−0.27)	0.02 (0.16)	−0.05 (−0.37)	0.00 (−0.03)	0.07 (0.58)	−0.06 (−0.46)	0.07 (0.56)	0.02 (0.17)	0.13	2.34
RAEH Growth Rate	2.515	5.44	0.00 (−0.01)	−0.03 (−0.22)	−0.09 (−0.70)	−0.05 (−0.37)	0.03 (0.21)	−0.04 (−0.33)	−0.02 (−0.12)	0.06 (0.49)	−0.07 (−0.58)	0.07 (0.59)	0.00 (−0.01)	0.10	1.96
Money															
M2	1.557	2.55	0.15 (1.55)	0.25 (2.70)	0.38 (4.26)	0.43 (4.98)	0.48 (5.72)	0.52 (6.41)	0.52 (6.33)	0.47 (5.56)	0.41 (4.73)	0.38 (4.30)	0.36 (3.99)	1.14	0.88
Monetary Base	4.992	8.16	0.02 (0.25)	0.05 (0.56)	0.05 (0.48)	0.01 (0.11)	0.02 (0.18)	−0.03 (−0.31)	−0.03 (−0.28)	0.01 (0.15)	−0.01 (−0.06)	−0.04 (−0.43)	−0.03 (−0.32)	0.87	0.28
Real M2	1.557	2.55	0.41 (4.63)	0.52 (6.27)	0.58 (7.38)	0.57 (7.33)	0.61 (8.06)	0.66 (9.38)	0.58 (7.48)	0.44 (5.19)	0.35 (3.85)	0.31 (3.41)	0.26 (2.77)	1.65	1.96
Real Monetary Base	4.849	7.93	0.11 (1.11)	0.14 (1.45)	0.11 (1.15)	0.06 (0.58)	0.06 (0.62)	0.02 (0.18)	0.00 (−0.04)	0.01 (0.11)	−0.02 (−0.25)	−0.06 (−0.65)	−0.06 (−0.65)	0.90	0.20
M2 Growth Rate	0.999	1.63	0.34 (3.74)	0.25 (2.68)	0.20 (2.16)	0.09 (0.89)	0.06 (0.66)	0.03 (0.36)	−0.01 (−0.07)	−0.07 (−0.72)	−0.08 (−0.88)	−0.05 (−0.53)	−0.03 (−0.32)	4.65	0.50
Monetary Base Growth Rate	5.214	8.52	0.01 (0.08)	0.03 (0.27)	−0.01 (−0.08)	−0.03 (−0.36)	0.01 (0.07)	−0.04 (−0.45)	0.01 (0.06)	0.04 (0.37)	−0.02 (−0.16)	−0.04 (−0.42)	0.01 (0.13)	0.88	0.38
Interest Rates															
Nominal Interest Rate 3 month	10.930	22.42	0.02 (0.19)	−0.12 (−1.07)	−0.15 (−1.38)	−0.06 (−0.53)	0.04 (0.36)	0.05 (0.45)	0.12 (1.07)	0.17 (1.58)	0.15 (1.32)	0.03 (0.25)	0.03 (0.30)	1.28	0.92
Real Nominal Interest Rate 3 month	19.444	39.65	−0.04 (−0.38)	−0.02 (−0.19)	−0.04 (−0.33)	−0.12 (−1.08)	−0.05 (−0.45)	0.03 (0.26)	0.01 (0.09)	0.01 (0.05)	0.12 (1.12)	0.14 (1.23)	0.03 (0.29)	0.98	0.49
Nominal Treasury Bonds 10 year	7.643	16.50	−0.12 (−0.71)	−0.20 (−1.23)	−0.16 (−0.99)	−0.10 (−0.64)	−0.05 (−0.31)	0.10 (0.61)	0.37 (2.52)	0.42 (2.86)	0.30 (1.93)	0.16 (0.95)	−0.01 (−0.07)	1.03	1.14
Madrid General Stock Market Index	11.333	23.48	0.40 (2.96)	0.41 (3.05)	0.42 (3.22)	0.33 (2.47)	0.20 (1.44)	0.08 (0.59)	−0.05 (−0.37)	−0.07 (−0.49)	−0.11 (−0.79)	−0.08 (−0.55)	−0.07 (−0.45)	1.97	1.00

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 24: Descriptive Statistics for Hodrick-Prescott Cyclical Component of Series. 1970-1998.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l) l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.384	1.00	0.35 (3.86)	0.53 (6.49)	0.70 (10.10)	0.84 (16.31)	0.95 (33.20)	1.00 (−)	0.95 (33.20)	0.84 (16.31)	0.70 (10.10)	0.53 (6.49)	0.35 (3.86)	-	-
Aggregate Consumption	1.361	0.98	0.36 (3.91)	0.51 (6.13)	0.66 (9.11)	0.78 (13.08)	0.85 (17.19)	0.86 (17.79)	0.80 (13.98)	0.69 (10.03)	0.57 (7.15)	0.44 (5.10)	0.34 (3.66)	5.69	0.58
Durables Consumption	4.218	3.05	0.51 (6.14)	0.60 (7.78)	0.68 (9.60)	0.72 (10.90)	0.72 (10.74)	0.65 (9.07)	0.54 (6.74)	0.38 (4.31)	0.20 (2.11)	0.02 (0.23)	−0.11 (−1.11)	5.31	3.46
Non Durables Consumption	1.071	0.77	0.19 (1.98)	0.34 (3.68)	0.49 (5.81)	0.63 (8.41)	0.73 (11.24)	0.78 (13.13)	0.77 (12.48)	0.71 (10.44)	0.64 (8.52)	0.56 (7.03)	0.50 (5.85)	2.16	0.91
Government Expenditure	1.043	0.75	−0.15 (−1.51)	−0.10 (−1.05)	−0.03 (−0.28)	0.08 (0.86)	0.21 (2.27)	0.33 (3.62)	0.39 (4.46)	0.42 (4.77)	0.43 (4.99)	0.45 (5.21)	0.46 (5.34)	1.82	1.49
Gross Fixed Investment	4.949	3.58	0.31 (3.32)	0.46 (5.35)	0.61 (7.92)	0.74 (11.29)	0.83 (15.48)	0.87 (18.58)	0.85 (16.78)	0.77 (12.59)	0.65 (8.93)	0.51 (6.10)	0.36 (3.91)	1.75	0.48
Change in Inventories	0.261	0.18	0.02 (0.26)	0.09 (0.91)	0.17 (1.74)	0.26 (2.79)	0.36 (4.07)	0.44 (5.12)	0.45 (5.22)	0.40 (4.51)	0.32 (3.53)	0.24 (2.51)	0.15 (1.51)	1.94	0.90
Investment	5.562	4.02	0.26 (2.79)	0.41 (4.69)	0.56 (7.02)	0.70 (10.05)	0.80 (14.04)	0.86 (17.57)	0.84 (16.28)	0.76 (12.34)	0.65 (8.88)	0.52 (6.20)	0.37 (4.08)	0.37	0.34
Exports	3.197	2.31	0.31 (3.32)	0.34 (3.67)	0.33 (3.62)	0.30 (3.22)	0.24 (2.58)	0.16 (1.67)	0.03 (0.34)	−0.11 (−1.15)	−0.25 (−2.64)	−0.37 (−4.14)	−0.49 (−5.74)	0.65	2.42
Imports	4.996	3.61	0.33 (3.56)	0.46 (5.30)	0.58 (7.42)	0.68 (9.68)	0.73 (11.28)	0.73 (11.16)	0.67 (9.45)	0.56 (7.09)	0.43 (4.95)	0.30 (3.24)	0.19 (1.99)	3.71	2.58
Net Exports	1.026	0.74	−0.10 (−1.04)	−0.20 (−2.07)	−0.31 (−3.36)	−0.41 (−4.72)	−0.49 (−5.88)	−0.53 (−6.59)	−0.55 (−6.80)	−0.52 (−6.41)	−0.48 (−5.66)	−0.43 (−4.90)	−0.39 (−4.37)	3.87	3.78
Sectoral Employment and Output															
Agriculture GVA	4.615	3.35	−0.02 (−0.17)	0.00 (−0.03)	0.02 (0.25)	0.07 (0.70)	0.11 (1.22)	0.15 (1.64)	0.16 (1.70)	0.16 (1.70)	0.17 (1.85)	0.21 (2.23)	0.26 (2.74)	0.27	2.23
Industry GVA	2.319	1.68	0.37 (4.13)	0.53 (6.53)	0.68 (9.68)	0.80 (14.10)	0.88 (19.82)	0.90 (21.71)	0.83 (15.77)	0.70 (10.31)	0.53 (6.52)	0.33 (3.65)	0.12 (1.20)	0.37	1.99
Construction GVA	3.792	2.75	0.25 (2.71)	0.41 (4.66)	0.55 (6.82)	0.66 (9.25)	0.75 (11.92)	0.80 (14.11)	0.80 (13.95)	0.75 (11.77)	0.66 (9.15)	0.54 (6.71)	0.40 (4.56)	1.07	0.37
Non Sale Services GVA	0.973	0.71	−0.33 (−3.57)	−0.18 (−1.91)	−0.01 (−0.11)	0.17 (1.79)	0.34 (3.81)	0.49 (5.93)	0.61 (8.06)	0.68 (9.68)	0.72 (10.69)	0.73 (11.09)	0.72 (10.77)	2.14	3.72
Sale Services GVA	0.976	0.71	0.36 (4.00)	0.53 (6.55)	0.68 (9.64)	0.79 (13.52)	0.86 (17.98)	0.88 (19.65)	0.82 (15.33)	0.72 (10.82)	0.58 (7.50)	0.44 (5.03)	0.28 (3.07)	0.77	0.65
Agricultural Employment	2.218	1.95	0.27 (2.08)	0.28 (2.26)	0.30 (2.42)	0.31 (2.51)	0.30 (2.42)	0.27 (2.18)	0.22 (1.78)	0.16 (1.24)	0.09 (0.69)	0.03 (0.25)	−0.03 (−0.20)	0.27	0.57
Industrial Employment	2.591	2.28	0.29 (2.30)	0.43 (3.59)	0.57 (5.31)	0.70 (7.63)	0.81 (10.74)	0.87 (14.21)	0.90 (16.43)	0.88 (14.28)	0.81 (10.45)	0.69 (7.17)	0.56 (5.10)	0.55	5.11
Construction Employment	5.512	4.85	0.38 (3.08)	0.52 (4.69)	0.65 (6.59)	0.76 (8.98)	0.83 (11.57)	0.86 (13.04)	0.83 (11.83)	0.77 (9.23)	0.67 (7.00)	0.56 (5.15)	0.43 (3.63)	1.29	2.83
Services Employment	1.758	1.55	0.46 (3.95)	0.59 (5.49)	0.68 (7.19)	0.75 (8.82)	0.79 (10.13)	0.80 (10.59)	0.78 (9.86)	0.73 (8.29)	0.65 (6.55)	0.55 (4.95)	0.43 (3.64)	1.07	1.87
Agriculture, Livestock and Fishing Emp.	2.392	2.84	−0.35 (−2.19)	−0.13 (−0.77)	0.02 (0.11)	0.19 (1.22)	0.38 (2.58)	0.49 (3.51)	0.52 (3.85)	0.48 (3.40)	0.42 (2.79)	0.37 (2.40)	0.29 (1.79)	0.56	1.82
Energy and Water Employment	3.036	3.61	−0.53 (−3.71)	−0.52 (−3.63)	−0.48 (−3.35)	−0.36 (−2.34)	−0.19 (−1.22)	−0.01 (−0.09)	0.16 (1.02)	0.35 (2.30)	0.45 (3.08)	0.47 (3.17)	0.51 (3.48)	0.37	1.60
Mining and Chemical Employment	2.296	2.73	−0.16 (−0.97)	−0.14 (−0.87)	−0.05 (−0.33)	0.05 (0.32)	0.13 (0.79)	0.26 (1.72)	0.36 (2.43)	0.46 (3.19)	0.52 (3.67)	0.54 (3.80)	0.54 (3.77)	0.30	1.49
Metal and Precision Employment	2.778	3.30	0.10 (0.58)	0.24 (1.48)	0.35 (2.28)	0.44 (2.98)	0.53 (3.89)	0.62 (5.05)	0.67 (5.68)	0.69 (5.86)	0.64 (5.13)	0.52 (3.64)	0.33 (2.08)	0.08	2.04
Other Manufacturing Employment	1.890	2.25	0.52 (3.62)	0.59 (4.33)	0.64 (5.04)	0.66 (5.42)	0.68 (5.79)	0.65 (5.37)	0.57 (4.38)	0.45 (3.13)	0.30 (1.91)	0.11 (0.67)	−0.05 (−0.29)	0.63	2.05
Construction Employment	4.597	5.46	0.31 (1.94)	0.47 (3.23)	0.61 (4.68)	0.70 (6.00)	0.74 (6.93)	0.73 (6.75)	0.66 (5.45)	0.53 (3.86)	0.39 (2.56)	0.25 (1.52)	0.13 (0.81)	2.41	1.34
Commerce and Hotel Employment	2.159	2.57	0.68 (5.49)	0.74 (6.51)	0.75 (6.94)	0.75 (6.98)	0.70 (6.07)	0.63 (5.13)	0.53 (3.93)	0.39 (2.59)	0.25 (1.55)	0.09 (0.52)	−0.08 (−0.45)	1.47	1.50

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20, respectively.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l)												
			l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.471	2.94	−0.16 (−0.99)	−0.11 (−0.66)	−0.01 (−0.06)	0.15 (0.92)	0.26 (1.71)	0.30 (2.02)	0.28 (1.83)	0.29 (1.83)	0.28 (1.78)	0.31 (1.99)	0.39 (2.47)	0.65	1.21
Finance and Insurance Employment	2.706	3.22	0.48 (3.22)	0.58 (4.29)	0.60 (4.50)	0.63 (4.97)	0.66 (5.51)	0.58 (4.52)	0.46 (3.22)	0.30 (1.95)	0.15 (0.92)	−0.03 (−0.20)	−0.24 (−1.46)	1.33	1.50
Others Services Employment	1.307	1.55	0.17 (1.05)	0.21 (1.28)	0.25 (1.54)	0.27 (1.70)	0.31 (2.05)	0.35 (2.37)	0.31 (2.02)	0.24 (1.55)	0.12 (0.73)	−0.04 (−0.27)	−0.11 (−0.65)	0.42	2.00
General Industrial Production Index	5.210	5.22	0.41 (4.25)	0.48 (5.12)	0.58 (6.72)	0.66 (8.25)	0.69 (9.21)	0.69 (9.19)	0.60 (7.11)	0.46 (4.85)	0.27 (2.61)	0.06 (0.53)	−0.09 (−0.82)	2.62	5.77
Energy and Water IPI	2.280	2.28	−0.08 (−0.73)	−0.01 (−0.06)	0.08 (0.73)	0.18 (1.76)	0.24 (2.39)	0.26 (2.54)	0.28 (2.74)	0.24 (2.39)	0.19 (1.80)	0.15 (1.40)	0.17 (1.64)	1.18	2.22
Mining and Chemical IPI	2.951	2.96	0.18 (1.68)	0.26 (2.49)	0.37 (3.70)	0.43 (4.53)	0.44 (4.63)	0.39 (4.09)	0.33 (3.30)	0.20 (1.98)	0.07 (0.66)	−0.04 (−0.39)	−0.11 (−0.99)	2.22	1.60
Metal and Precision IPI	5.210	5.22	0.41 (4.25)	0.48 (5.12)	0.58 (6.72)	0.66 (8.25)	0.69 (9.21)	0.69 (9.19)	0.60 (7.11)	0.46 (4.85)	0.27 (2.61)	0.06 (0.53)	−0.09 (−0.82)	2.62	5.77
Other Manufacturing IPI	2.327	2.33	0.27 (2.61)	0.37 (3.76)	0.48 (5.14)	0.51 (5.68)	0.48 (5.17)	0.39 (4.01)	0.30 (2.98)	0.16 (1.57)	0.03 (0.30)	−0.06 (−0.57)	−0.10 (−0.90)	2.07	1.56
Aggregate Employment and Productivity															
Labour Force	0.641	0.46	0.28 (3.02)	0.40 (4.57)	0.52 (6.39)	0.61 (8.18)	0.68 (9.77)	0.70 (10.28)	0.69 (9.96)	0.64 (8.62)	0.55 (6.85)	0.41 (4.71)	0.27 (2.93)	2.22	4.12
Employment	1.499	1.09	0.25 (2.71)	0.39 (4.41)	0.52 (6.34)	0.63 (8.48)	0.71 (10.64)	0.76 (12.43)	0.77 (12.88)	0.74 (11.70)	0.68 (9.58)	0.57 (7.29)	0.45 (5.25)	2.42	1.99
Government Employment	2.560	2.50	−0.07 (−0.62)	−0.03 (−0.27)	0.03 (0.24)	0.09 (0.85)	0.17 (1.58)	0.26 (2.50)	0.34 (3.28)	0.39 (3.83)	0.42 (4.18)	0.43 (4.31)	0.43 (4.23)	0.75	1.39
Activity Rate	0.434	0.42	0.52 (5.48)	0.59 (6.61)	0.63 (7.39)	0.63 (7.43)	0.59 (6.68)	0.51 (5.53)	0.42 (4.21)	0.31 (2.99)	0.24 (2.22)	0.18 (1.62)	0.12 (1.13)	2.58	2.41
Unemployment Rate	6.663	4.83	0.22 (2.36)	0.17 (1.83)	0.09 (0.91)	−0.02 (−0.23)	−0.12 (−1.33)	−0.23 (−2.46)	−0.36 (−4.01)	−0.47 (−5.60)	−0.51 (−6.26)	−0.53 (−6.42)	−0.50 (−6.04)	1.57	1.16
Average Hours Wage-earners	0.748	0.54	0.17 (1.74)	0.16 (1.65)	0.13 (1.42)	0.11 (1.14)	0.08 (0.82)	0.05 (0.48)	0.01 (0.08)	−0.02 (−0.17)	−0.03 (−0.27)	−0.06 (−0.58)	−0.10 (−1.02)	0.20	1.08
Average Hours Employees	0.575	0.56	0.16 (1.44)	0.16 (1.47)	0.16 (1.43)	0.12 (1.13)	0.08 (0.78)	0.06 (0.56)	0.01 (0.12)	−0.05 (−0.42)	−0.10 (−0.88)	−0.12 (−1.05)	−0.10 (−0.88)	0.49	0.59
Total Hours Wage-earners	2.089	1.52	0.38 (4.19)	0.45 (5.26)	0.51 (6.23)	0.55 (7.00)	0.58 (7.41)	0.57 (7.33)	0.53 (6.64)	0.48 (5.66)	0.40 (4.62)	0.32 (3.48)	0.23 (2.39)	1.28	2.46
Total Hours Employees	1.785	1.75	0.40 (3.88)	0.53 (5.67)	0.65 (7.81)	0.74 (10.18)	0.81 (12.54)	0.83 (14.05)	0.82 (13.15)	0.76 (10.82)	0.68 (8.42)	0.58 (6.40)	0.47 (4.83)	1.50	2.38
Labour Productivity Wage-earners	2.123	1.54	−0.26 (−2.73)	−0.24 (−2.59)	−0.23 (−2.52)	−0.19 (−1.98)	−0.12 (−1.28)	−0.05 (−0.53)	−0.01 (−0.07)	0.00 (0.03)	−0.01 (−0.14)	−0.02 (−0.17)	−0.04 (−0.46)	3.42	0.31
Labour Productivity Employees	2.418	2.37	−0.09 (−0.84)	−0.10 (−0.94)	−0.15 (−1.34)	−0.15 (−1.35)	−0.12 (−1.14)	−0.12 (−1.13)	−0.15 (−1.42)	−0.15 (−1.41)	−0.14 (−1.26)	−0.13 (−1.21)	−0.15 (−1.40)	1.22	1.32
Capacity Utilization	2.521	1.83	0.46 (5.42)	0.55 (6.77)	0.61 (8.03)	0.61 (8.18)	0.56 (7.05)	0.46 (5.52)	0.34 (3.82)	0.18 (1.89)	−0.01 (−0.11)	−0.19 (−2.05)	−0.34 (−3.79)	3.84	3.24
Total Factor Productivity (epa)	0.743	0.73	0.10 (0.89)	0.07 (0.62)	0.04 (0.37)	0.04 (0.40)	0.08 (0.70)	0.07 (0.63)	−0.02 (−0.23)	−0.14 (−1.34)	−0.24 (−2.22)	−0.30 (−2.88)	−0.37 (−3.58)	1.04	3.65
Total Factor Productivity (es)	1.198	0.87	−0.08 (−0.79)	0.01 (0.09)	0.11 (1.11)	0.21 (2.22)	0.30 (3.30)	0.35 (3.99)	0.35 (3.88)	0.27 (2.97)	0.17 (1.79)	0.06 (0.67)	−0.04 (−0.44)	1.20	1.18
Vacancies	20.967	20.26	0.32 (2.97)	0.30 (2.83)	0.31 (2.91)	0.33 (3.10)	0.34 (3.23)	0.34 (3.27)	0.34 (3.25)	0.33 (3.10)	0.29 (2.73)	0.24 (2.17)	0.17 (1.54)	1.42	0.57
Prices and Wages															
Consumer Price Index	1.345	0.98	−0.40 (−4.54)	−0.36 (−3.96)	−0.30 (−3.29)	−0.25 (−2.68)	−0.19 (−2.09)	−0.14 (−1.49)	−0.09 (−0.94)	−0.04 (−0.47)	0.00 (−0.04)	0.02 (0.17)	0.03 (0.29)	1.51	0.57
Producer Price Index	1.923	1.93	−0.33 (−3.25)	−0.31 (−3.04)	−0.25 (−2.43)	−0.17 (−1.68)	−0.11 (−1.01)	−0.06 (−0.60)	−0.05 (−0.51)	−0.06 (−0.56)	−0.08 (−0.73)	−0.11 (−1.04)	−0.15 (−1.46)	2.08	1.07
GDP Price Deflactor	1.378	1.00	−0.47 (−5.49)	−0.43 (−4.98)	−0.37 (−4.12)	−0.30 (−3.27)	−0.24 (−2.55)	−0.17 (−1.84)	−0.08 (−0.81)	0.01 (0.15)	0.08 (0.79)	0.10 (1.09)	0.13 (1.32)	2.40	1.08
Inflation Rate (CPI)	0.722	0.52	−0.04 (−0.43)	0.00 (0.03)	0.04 (0.38)	0.04 (0.45)	0.05 (0.57)	0.07 (0.79)	0.10 (1.04)	0.09 (0.91)	0.08 (0.84)	0.04 (0.40)	0.03 (0.26)	0.40	0.91
Inflation Rate (PPI)	0.709	0.71	−0.03 (−0.28)	0.07 (0.62)	0.18 (1.69)	0.22 (2.14)	0.20 (1.93)	0.11 (1.03)	0.03 (0.28)	−0.01 (−0.08)	−0.05 (−0.43)	−0.09 (−0.82)	−0.11 (−1.03)	2.59	0.95

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20, respectively.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l)											$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
			l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5		
Inflation Rate (DGDP)	27.096	19.66	0.01	0.04	0.12	0.15	0.15	0.16	0.21	0.20	0.13	0.06	0.05	2.82	1.86
			(0.09)	(0.39)	(1.22)	(1.58)	(1.64)	(1.67)	(2.29)	(2.09)	(1.38)	(0.66)	(0.56)		
Unitary Labour Cost Index	2.486	1.80	−0.47	−0.45	−0.42	−0.38	−0.33	−0.24	−0.13	0.00	0.14	0.27	0.39	2.26	4.62
			(−5.55)	(−5.19)	(−4.84)	(−4.34)	(−3.63)	(−2.65)	(−1.41)	(0.02)	(1.49)	(2.95)	(4.39)		
Average Earnings per Hour	1.165	1.05	−0.49	−0.50	−0.49	−0.45	−0.39	−0.32	−0.28	−0.18	−0.09	0.00	0.10	1.48	2.43
			(−4.50)	(−4.56)	(−4.48)	(−4.05)	(−3.46)	(−2.82)	(−2.36)	(−1.46)	(−0.71)	(−0.02)	(0.81)		
Real Average Earnings per Hour	1.019	0.92	−0.14	−0.15	−0.15	−0.12	−0.08	−0.03	−0.01	0.06	0.12	0.19	0.26	0.30	2.27
			(−1.12)	(−1.21)	(−1.21)	(−1.00)	(−0.63)	(−0.24)	(−0.06)	(0.53)	(1.00)	(1.54)	(2.13)		
ULCI Growth Rate	0.668	0.48	−0.01	0.00	0.02	0.08	0.16	0.28	0.39	0.48	0.50	0.47	0.43	0.94	3.72
			(−0.16)	(0.02)	(0.26)	(0.85)	(1.74)	(3.09)	(4.52)	(5.71)	(6.02)	(5.56)	(4.91)		
AEH Growth Rate	1.679	1.52	0.00	0.03	0.02	0.04	0.08	0.10	0.05	0.09	0.08	0.07	0.09	0.46	1.71
			(0.03)	(0.22)	(0.20)	(0.29)	(0.67)	(0.81)	(0.40)	(0.74)	(0.62)	(0.60)	(0.71)		
RAEH Growth Rate	1.696	1.53	0.00	0.03	0.02	0.03	0.08	0.09	0.02	0.06	0.05	0.05	0.05	0.51	1.49
			(0.03)	(0.23)	(0.19)	(0.22)	(0.62)	(0.73)	(0.16)	(0.47)	(0.37)	(0.37)	(0.41)		
Money															
M2	3.199	2.32	0.18	0.38	0.54	0.66	0.73	0.75	0.73	0.67	0.58	0.49	0.39	3.18	1.59
			(1.84)	(4.25)	(6.75)	(9.17)	(11.19)	(12.09)	(11.17)	(9.39)	(7.50)	(5.80)	(4.34)		
Monetary Base	7.343	5.33	−0.05	−0.06	−0.08	−0.09	−0.09	−0.09	−0.09	−0.07	−0.06	−0.06	−0.05	0.65	0.27
			(−0.49)	(−0.67)	(−0.82)	(−0.94)	(−0.97)	(−1.00)	(−0.91)	(−0.74)	(−0.65)	(−0.63)	(−0.55)		
Real M2	3.329	2.42	0.36	0.54	0.67	0.76	0.80	0.79	0.73	0.63	0.52	0.41	0.30	2.57	2.44
			(4.03)	(6.72)	(9.53)	(12.11)	(13.92)	(13.82)	(11.33)	(8.59)	(6.37)	(4.66)	(3.26)		
Real Monetary Base	7.396	5.37	0.04	0.02	−0.01	−0.03	−0.05	−0.06	−0.07	−0.07	−0.08	−0.08	−0.08	0.59	0.21
			(0.42)	(0.17)	(−0.10)	(−0.35)	(−0.50)	(−0.65)	(−0.75)	(−0.76)	(−0.79)	(−0.83)	(−0.79)		
M2 Growth Rate	1.078	0.78	0.59	0.54	0.44	0.30	0.17	0.04	−0.14	−0.27	−0.33	−0.34	−0.32	3.95	1.45
			(7.48)	(6.57)	(5.08)	(3.31)	(1.84)	(0.44)	(−1.50)	(−2.87)	(−3.60)	(−3.70)	(−3.47)		
Monetary Base Growth Rate	4.536	3.30	−0.07	−0.04	−0.03	−0.03	−0.01	−0.01	0.01	0.02	0.01	0.01	0.01	0.84	0.23
			(−0.73)	(−0.42)	(−0.35)	(−0.28)	(−0.13)	(−0.09)	(0.12)	(0.26)	(0.10)	(0.08)	(0.13)		
Interest Rates															
Nominal Interest Rate 3 month	13.400	12.98	0.06	0.04	0.06	0.13	0.22	0.30	0.35	0.38	0.34	0.25	0.17	0.89	2.14
			(0.57)	(0.36)	(0.50)	(1.15)	(2.03)	(2.86)	(3.45)	(3.68)	(3.20)	(2.28)	(1.57)		
Real Nominal Interest Rate 3 month	19.394	18.73	0.04	0.04	0.03	0.03	0.08	0.14	0.20	0.25	0.28	0.26	0.23	0.60	1.81
			(0.32)	(0.33)	(0.24)	(0.25)	(0.70)	(1.31)	(1.85)	(2.33)	(2.64)	(2.35)	(2.05)		
Nominal Treasury Bonds 10 year	12.495	10.40	−0.04	−0.07	−0.07	−0.04	0.01	0.08	0.14	0.13	0.04	−0.10	−0.27	0.38	1.70
			(−0.25)	(−0.45)	(−0.44)	(−0.23)	(0.08)	(0.51)	(0.87)	(0.79)	(0.27)	(−0.59)	(−1.65)		
Madrid General Stock Market Index	17.269	14.13	0.59	0.60	0.56	0.45	0.32	0.19	0.05	−0.10	−0.22	−0.27	−0.27	0.95	0.38
			(5.06)	(5.16)	(4.68)	(3.61)	(2.45)	(1.42)	(0.32)	(−0.73)	(−1.56)	(−1.92)	(−1.90)		

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20, respectively.

Table 25: Descriptive Statistics for Baxter-King Cyclical Componets of Series.1970-1998.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l) l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.376	1	0.38 (4.17)	0.55 (6.72)	0.71 (10.53)	0.86 (17.54)	0.96 (37.34)	1.00 (−)	0.96 (37.34)	0.86 (17.54)	0.71 (10.53)	0.55 (6.72)	0.38 (4.17)	-	-
Aggregate Consumption	1.397	1.01	0.39 (4.28)	0.53 (6.47)	0.67 (9.38)	0.79 (13.23)	0.85 (17.21)	0.86 (17.95)	0.80 (14.07)	0.70 (10.20)	0.59 (7.47)	0.48 (5.62)	0.39 (4.33)	0.49	0.56
Durables Consumption	4.172	3.03	0.54 (6.64)	0.64 (8.55)	0.71 (10.56)	0.76 (11.99)	0.75 (11.76)	0.68 (9.82)	0.56 (7.08)	0.41 (4.62)	0.24 (2.54)	0.08 (0.83)	−0.05 (−0.51)	1.92	1.45
Non Durables Consumption	1.134	0.82	0.25 (2.64)	0.38 (4.22)	0.52 (6.24)	0.64 (8.77)	0.74 (11.51)	0.78 (13.28)	0.76 (12.03)	0.69 (10.00)	0.63 (8.42)	0.58 (7.31)	0.54 (6.49)	0.76	1.40
Government Expenditure	1.122	0.81	−0.07 (−0.72)	−0.03 (−0.34)	0.04 (0.38)	0.14 (1.46)	0.25 (2.75)	0.35 (3.98)	0.37 (4.17)	0.38 (4.33)	0.41 (4.62)	0.44 (5.02)	0.47 (5.50)	5.44	1.92
Gross Fixed Investment	4.692	3.40	0.30 (3.17)	0.45 (5.18)	0.60 (7.86)	0.74 (11.45)	0.83 (15.56)	0.85 (17.27)	0.84 (16.43)	0.77 (12.54)	0.65 (8.90)	0.51 (6.14)	0.37 (4.02)	4.98	1.91
Change in Inventories	0.266	0.19	0.00 (−0.02)	0.05 (0.53)	0.13 (1.40)	0.23 (2.51)	0.33 (3.67)	0.40 (4.57)	0.42 (4.89)	0.39 (4.39)	0.31 (3.36)	0.21 (2.23)	0.13 (1.31)	0.48	2.16
Investment	5.270	3.82	0.25 (2.70)	0.40 (4.56)	0.56 (7.01)	0.70 (10.26)	0.80 (14.05)	0.84 (16.15)	0.84 (15.98)	0.77 (12.41)	0.65 (8.83)	0.51 (6.11)	0.37 (4.07)	3.80	2.05
Exports	3.119	2.26	0.28 (2.99)	0.31 (3.36)	0.31 (3.39)	0.29 (3.15)	0.25 (2.68)	0.19 (2.00)	0.04 (0.37)	−0.11 (−1.14)	−0.24 (−2.53)	−0.36 (−3.91)	−0.46 (−5.37)	2.66	3.68
Imports	4.754	3.45	0.32 (3.51)	0.46 (5.31)	0.59 (7.48)	0.69 (9.86)	0.74 (11.51)	0.73 (11.09)	0.66 (9.09)	0.55 (6.84)	0.43 (4.93)	0.32 (3.46)	0.23 (2.39)	1.35	1.87
Net Exports	0.996	0.72	−0.10 (−1.08)	−0.20 (−2.11)	−0.31 (−3.36)	−0.41 (−4.67)	−0.48 (−5.73)	−0.51 (−6.19)	−0.52 (−6.43)	−0.50 (−6.06)	−0.47 (−5.43)	−0.43 (−4.86)	−0.40 (−4.48)	1.92	1.98
Sectoral Employment and output															
Agriculture GVA	4.666	3.42	0.00 (−0.04)	0.00 (−0.05)	0.01 (0.15)	0.05 (0.56)	0.10 (1.08)	0.15 (1.58)	0.16 (1.70)	0.16 (1.68)	0.16 (1.70)	0.18 (1.94)	0.23 (2.40)	1.51	3.27
Industry GVA	2.284	1.67	0.36 (3.98)	0.52 (6.37)	0.68 (9.69)	0.81 (14.49)	0.89 (20.44)	0.90 (21.84)	0.85 (16.81)	0.73 (11.17)	0.56 (7.08)	0.37 (4.07)	0.16 (1.68)	3.22	5.04
Construction GVA	3.620	2.65	0.29 (3.09)	0.43 (4.99)	0.57 (7.24)	0.68 (9.78)	0.75 (12.13)	0.78 (13.08)	0.77 (12.80)	0.72 (10.90)	0.63 (8.48)	0.51 (6.20)	0.38 (4.21)	1.77	1.30
Non Sale Services GVA	1.007	0.74	−0.27 (−2.87)	−0.12 (−1.30)	0.04 (0.47)	0.22 (2.35)	0.37 (4.25)	0.49 (5.96)	0.60 (7.95)	0.67 (9.38)	0.69 (10.09)	0.70 (10.16)	0.69 (9.79)	2.54	5.44
Sale Services GVA	0.989	0.72	0.41 (4.68)	0.57 (7.27)	0.72 (10.71)	0.83 (15.32)	0.88 (20.01)	0.89 (20.15)	0.84 (16.06)	0.73 (11.36)	0.60 (7.77)	0.44 (5.13)	0.29 (3.16)	2.09	0.86
Agricultural Employment	1.918	1.91	0.19 (1.76)	0.19 (1.77)	0.20 (1.89)	0.22 (2.02)	0.22 (2.03)	0.19 (1.84)	0.15 (1.44)	0.11 (0.97)	0.06 (0.54)	0.01 (0.13)	−0.03 (−0.27)	1.58	0.49
Industrial Employment	2.219	2.21	0.26 (2.45)	0.38 (3.70)	0.50 (5.31)	0.63 (7.35)	0.73 (9.81)	0.80 (12.33)	0.83 (13.94)	0.82 (13.22)	0.76 (10.77)	0.67 (8.18)	0.56 (6.08)	1.36	3.25
Construction Employment	4.508	4.48	0.38 (3.72)	0.53 (5.61)	0.65 (7.87)	0.75 (10.41)	0.81 (12.70)	0.83 (13.65)	0.81 (12.57)	0.75 (10.34)	0.66 (8.03)	0.56 (6.05)	0.44 (4.43)	3.63	3.10
Services Employment	1.422	1.41	0.48 (4.94)	0.58 (6.53)	0.66 (8.11)	0.72 (9.48)	0.74 (10.29)	0.74 (10.26)	0.71 (9.30)	0.65 (7.89)	0.58 (6.42)	0.49 (5.10)	0.41 (3.99)	2.22	2.38
Agriculture, Livestock and Fishing Emp.	2.072	2.05	0.05 (0.37)	0.07 (0.51)	0.11 (0.83)	0.15 (1.20)	0.18 (1.44)	0.18 (1.47)	0.16 (1.27)	0.12 (0.97)	0.08 (0.60)	0.02 (0.19)	−0.04 (−0.30)	2.75	0.68
Energy and Water Employment	3.022	2.98	0.14 (1.05)	0.14 (1.10)	0.14 (1.14)	0.16 (1.25)	0.18 (1.46)	0.21 (1.71)	0.22 (1.80)	0.23 (1.86)	0.22 (1.75)	0.18 (1.44)	0.12 (0.96)	2.04	1.22
Mining and Chemical Employment	2.312	2.28	0.32 (2.63)	0.38 (3.23)	0.42 (3.63)	0.45 (4.00)	0.49 (4.47)	0.54 (5.08)	0.58 (5.71)	0.63 (6.41)	0.67 (7.02)	0.68 (7.24)	0.67 (6.87)	4.77	2.86
Metal and Precision Employment	2.481	2.45	0.39 (3.25)	0.46 (3.97)	0.53 (4.84)	0.60 (5.90)	0.67 (7.13)	0.72 (8.26)	0.73 (8.45)	0.70 (7.76)	0.65 (6.60)	0.57 (5.31)	0.47 (4.10)	3.31	3.21
Other Manufacturing Employment	1.900	1.88	0.62 (6.13)	0.68 (7.14)	0.72 (8.14)	0.76 (9.07)	0.77 (9.64)	0.76 (9.39)	0.72 (8.17)	0.66 (6.90)	0.60 (5.88)	0.55 (5.12)	0.51 (4.53)	1.16	1.23
Construction Employment	4.469	4.41	0.53 (4.86)	0.65 (6.57)	0.75 (8.73)	0.81 (11.07)	0.84 (12.34)	0.82 (11.42)	0.76 (9.14)	0.67 (7.20)	0.60 (5.86)	0.54 (4.97)	0.49 (4.30)	5.33	3.58
Commerce and Hotel Employment	1.901	1.88	0.72 (8.07)	0.77 (9.34)	0.80 (10.26)	0.80 (10.51)	0.78 (9.95)	0.74 (8.73)	0.66 (7.07)	0.58 (5.60)	0.50 (4.48)	0.43 (3.65)	0.37 (3.02)	1.88	0.62

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l) l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.249	2.22	0.28 (2.23)	0.31 (2.53)	0.33 (2.74)	0.34 (2.86)	0.34 (2.83)	0.31 (2.60)	0.26 (2.12)	0.21 (1.72)	0.20 (1.59)	0.23 (1.82)	0.30 (2.42)	1.49	1.25
Finance and Insurance Employment	2.341	2.31	0.61 (5.99)	0.70 (7.59)	0.75 (8.99)	0.77 (9.54)	0.75 (8.93)	0.69 (7.56)	0.59 (5.86)	0.48 (4.35)	0.37 (3.14)	0.28 (2.22)	0.20 (1.57)	2.43	1.20
Others Services Employment	1.135	1.12	0.45 (3.84)	0.52 (4.72)	0.56 (5.28)	0.57 (5.47)	0.56 (5.33)	0.53 (4.97)	0.48 (4.34)	0.42 (3.63)	0.35 (2.95)	0.29 (2.38)	0.25 (2.00)	2.13	4.16
General Industrial Production Index	2.137	2.17	0.36 (3.56)	0.48 (5.13)	0.60 (7.15)	0.70 (9.32)	0.74 (10.56)	0.70 (9.44)	0.58 (6.88)	0.41 (4.25)	0.21 (2.07)	0.04 (0.34)	−0.09 (−0.87)	4.92	4.69
Energy and Water IPI	1.739	1.77	−0.03 (−0.27)	0.03 (0.28)	0.10 (0.99)	0.19 (1.80)	0.26 (2.53)	0.28 (2.84)	0.26 (2.57)	0.20 (1.90)	0.13 (1.20)	0.09 (0.80)	0.10 (0.92)	3.06	3.34
Mining and Chemical IPI	2.684	2.73	0.14 (1.36)	0.23 (2.24)	0.32 (3.23)	0.40 (4.10)	0.42 (4.48)	0.39 (4.06)	0.31 (3.06)	0.18 (1.75)	0.05 (0.47)	−0.06 (−0.58)	−0.13 (−1.26)	3.23	1.06
Metal and Precision IPI	4.458	4.53	0.38 (3.81)	0.46 (4.91)	0.57 (6.53)	0.67 (8.60)	0.74 (10.52)	0.74 (10.62)	0.66 (8.35)	0.50 (5.52)	0.31 (3.04)	0.10 (0.95)	−0.08 (−0.78)	6.86	9.63
Other Manufacturing IPI	2.057	2.09	0.31 (3.06)	0.44 (4.56)	0.54 (5.99)	0.58 (6.77)	0.55 (6.35)	0.45 (4.84)	0.32 (3.21)	0.17 (1.62)	0.03 (0.32)	−0.06 (−0.57)	−0.10 (−0.92)	6.10	1.55
Aggregate Employment and Productivity															
Labour Force	0.590	0.43	0.29 (3.09)	0.41 (4.68)	0.53 (6.56)	0.63 (8.60)	0.70 (10.36)	0.72 (11.11)	0.71 (10.54)	0.65 (9.06)	0.57 (7.21)	0.45 (5.25)	0.30 (3.28)	2.63	3.82
Employment	1.420	1.04	0.28 (3.07)	0.41 (4.66)	0.53 (6.55)	0.64 (8.67)	0.71 (10.71)	0.75 (11.87)	0.76 (12.23)	0.73 (11.15)	0.66 (9.23)	0.57 (7.12)	0.45 (5.14)	2.45	3.16
Government Employment	2.362	2.35	−0.04 (−0.32)	−0.02 (−0.18)	0.01 (0.06)	0.06 (0.51)	0.12 (1.16)	0.20 (1.90)	0.27 (2.58)	0.32 (3.12)	0.36 (3.46)	0.37 (3.62)	0.37 (3.62)	5.25	1.16
Activity Rate	0.422	0.42	0.54 (5.77)	0.61 (7.06)	0.66 (8.01)	0.66 (8.11)	0.62 (7.27)	0.54 (5.93)	0.44 (4.51)	0.34 (3.32)	0.26 (2.42)	0.19 (1.79)	0.14 (1.31)	2.68	1.04
Unemployment Rate	6.533	4.78	0.12 (1.24)	0.08 (0.79)	0.00 (0.02)	−0.08 (−0.88)	−0.16 (−1.66)	−0.20 (−2.11)	−0.33 (−3.66)	−0.43 (−5.02)	−0.48 (−5.79)	−0.49 (−5.89)	−0.47 (−5.47)	1.25	1.90
Average Hours Wage-earners	0.561	0.41	0.19 (1.95)	0.16 (1.70)	0.14 (1.43)	0.10 (1.09)	0.06 (0.68)	0.03 (0.27)	−0.01 (−0.13)	−0.04 (−0.44)	−0.07 (−0.69)	−0.09 (−0.93)	−0.12 (−1.29)	1.18	1.07
Average Hours Employees	0.532	0.53	0.20 (1.81)	0.18 (1.66)	0.15 (1.35)	0.11 (1.04)	0.08 (0.74)	0.04 (0.39)	−0.02 (−0.18)	−0.09 (−0.83)	−0.15 (−1.40)	−0.18 (−1.69)	−0.17 (−1.55)	1.18	1.13
Total Hours Wage-earners	1.999	1.46	0.43 (4.92)	0.50 (5.95)	0.55 (6.93)	0.59 (7.64)	0.59 (7.80)	0.57 (7.30)	0.53 (6.57)	0.47 (5.60)	0.40 (4.53)	0.32 (3.47)	0.23 (2.44)	1.39	2.49
Total Hours Employees	1.662	1.65	0.42 (4.22)	0.55 (5.91)	0.65 (7.89)	0.74 (10.10)	0.80 (12.13)	0.81 (12.95)	0.79 (11.74)	0.72 (9.58)	0.63 (7.42)	0.53 (5.64)	0.43 (4.27)	3.38	4.59
Labour Productivity Wage-earners	1.547	1.13	−0.34 (−3.79)	−0.30 (−3.25)	−0.23 (−2.45)	−0.14 (−1.52)	−0.06 (−0.65)	0.00 (0.00)	0.05 (0.53)	0.06 (0.65)	0.04 (0.46)	0.01 (0.15)	−0.01 (−0.11)	1.37	1.34
Labour Productivity Employees	1.192	1.19	−0.14 (−1.28)	−0.19 (−1.78)	−0.22 (−2.07)	−0.23 (−2.15)	−0.22 (−2.08)	−0.21 (−1.99)	−0.21 (−1.97)	−0.22 (−2.03)	−0.22 (−2.10)	−0.22 (−2.06)	−0.20 (−1.85)	4.54	0.38
Capacity Utilization	2.324	1.70	0.44 (5.06)	0.54 (6.74)	0.61 (8.00)	0.62 (8.28)	0.57 (7.32)	0.46 (5.52)	0.34 (3.77)	0.17 (1.82)	−0.01 (−0.15)	−0.20 (−2.10)	−0.36 (−3.96)	4.19	2.44
Total Factor Productivity (epa)	0.726	0.72	0.08 (0.71)	0.04 (0.41)	0.05 (0.49)	0.08 (0.77)	0.10 (0.97)	0.09 (0.83)	0.03 (0.26)	−0.07 (−0.63)	−0.17 (−1.59)	−0.26 (−2.40)	−0.31 (−2.95)	3.48	0.93
Total Factor Productivity (es)	1.188	0.87	−0.13 (−1.35)	−0.03 (−0.36)	0.08 (0.84)	0.20 (2.11)	0.29 (3.22)	0.34 (3.83)	0.32 (3.61)	0.26 (2.84)	0.17 (1.78)	0.06 (0.66)	−0.03 (−0.36)	1.34	1.69
Vacancies	19.084	18.77	0.31 (2.82)	0.29 (2.66)	0.28 (2.59)	0.29 (2.68)	0.31 (2.91)	0.33 (3.15)	0.34 (3.23)	0.33 (3.12)	0.30 (2.84)	0.27 (2.43)	0.21 (1.86)	1.94	2.07
Prices and Wages															
Consumer Price Index	1.748	1.28	−0.45 (−5.22)	−0.40 (−4.48)	−0.34 (−3.72)	−0.27 (−2.95)	−0.20 (−2.14)	−0.12 (−1.27)	−0.08 (−0.84)	−0.04 (−0.44)	−0.01 (−0.09)	0.02 (0.16)	0.03 (0.29)	4.26	2.34
Producer Price Index	2.110	2.14	−0.42 (−4.36)	−0.40 (−4.11)	−0.34 (−3.43)	−0.26 (−2.59)	−0.19 (−1.88)	−0.15 (−1.46)	−0.14 (−1.33)	−0.14 (−1.35)	−0.15 (−1.46)	−0.17 (−1.67)	−0.21 (−2.02)	1.21	1.03
GDP Price Deflactor	1.746	1.28	−0.49 (−5.86)	−0.42 (−4.84)	−0.35 (−3.87)	−0.27 (−2.97)	−0.19 (−2.05)	−0.10 (−1.06)	−0.02 (−0.26)	0.05 (0.49)	0.10 (1.10)	0.14 (1.48)	0.15 (1.60)	2.57	2.74
Inflation Rate (CPI)	0.382	0.28	−0.04 (−0.44)	0.03 (0.29)	0.08 (0.88)	0.13 (1.34)	0.16 (1.71)	0.18 (1.95)	0.19 (1.99)	0.18 (1.91)	0.15 (1.62)	0.11 (1.13)	0.05 (0.56)	2.23	2.61
Inflation Rate (PPI)	0.684	0.70	−0.06 (−0.57)	0.07 (0.68)	0.19 (1.84)	0.25 (2.44)	0.22 (2.16)	0.11 (1.10)	0.04 (0.37)	−0.01 (−0.12)	−0.04 (−0.35)	−0.06 (−0.55)	−0.10 (−0.90)	2.26	1.03
Inflation Rate (DGDP)	20.764	15.21	0.09 (0.95)	0.14 (1.51)	0.18 (1.90)	0.21 (2.24)	0.24 (2.60)	0.27 (2.94)	0.27 (2.95)	0.24 (2.64)	0.19 (2.01)	0.12 (1.20)	0.04 (0.40)	0.29	1.72

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l)											$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
			l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5		
Unitary Labour Cost Index	2.727	2.00	−0.42 (−4.84)	−0.39 (−4.45)	−0.37 (−4.11)	−0.33 (−3.68)	−0.27 (−3.00)	−0.19 (−2.01)	−0.10 (−1.03)	0.01 (0.13)	0.13 (1.39)	0.25 (2.65)	0.35 (3.85)	7.55	7.66
Average Earnings per Hour	0.825	0.79	−0.63 (−6.41)	−0.64 (−6.61)	−0.62 (−6.40)	−0.59 (−5.87)	−0.54 (−5.21)	−0.48 (−4.45)	−0.40 (−3.61)	−0.31 (−2.63)	−0.19 (−1.53)	−0.07 (−0.52)	0.03 (0.27)	2.82	3.05
Real Average Earnings per Hour	0.657	0.63	−0.17 (−1.35)	−0.19 (−1.52)	−0.17 (−1.39)	−0.13 (−1.05)	−0.08 (−0.66)	−0.03 (−0.23)	0.03 (0.22)	0.10 (0.84)	0.20 (1.62)	0.29 (2.44)	0.38 (3.22)	1.29	1.98
ULCI Growth Rate	0.632	0.46	0.01 (0.10)	0.00 (−0.05)	0.00 (0.01)	0.05 (0.51)	0.14 (1.51)	0.26 (2.88)	0.37 (4.23)	0.45 (5.36)	0.49 (5.88)	0.48 (5.61)	0.42 (4.82)	5.64	4.53
AEH Growth Rate	0.373	0.36	−0.06 (−0.47)	−0.02 (−0.14)	0.03 (0.27)	0.08 (0.65)	0.11 (0.89)	0.14 (1.16)	0.18 (1.48)	0.24 (1.97)	0.28 (2.39)	0.28 (2.34)	0.23 (1.87)	0.63	6.74
RAEH Growth Rate	0.380	0.36	−0.07 (−0.55)	−0.03 (−0.21)	0.03 (0.26)	0.08 (0.63)	0.09 (0.75)	0.10 (0.81)	0.11 (0.89)	0.14 (1.16)	0.17 (1.42)	0.17 (1.35)	0.12 (0.97)	1.11	4.55
Money															
M2	3.313	2.43	0.16 (1.68)	0.36 (4.05)	0.53 (6.46)	0.64 (8.75)	0.71 (10.49)	0.73 (11.26)	0.71 (10.65)	0.66 (9.29)	0.59 (7.67)	0.50 (6.07)	0.41 (4.60)	5.77	2.21
Monetary Base	7.030	5.15	−0.05 (−0.54)	−0.07 (−0.75)	−0.08 (−0.88)	−0.09 (−0.95)	−0.09 (−0.94)	−0.08 (−0.80)	−0.06 (−0.64)	−0.04 (−0.45)	−0.03 (−0.31)	−0.03 (−0.28)	−0.03 (−0.33)	1.72	1.33
Real M2	3.246	2.38	0.43 (4.92)	0.60 (7.75)	0.72 (10.97)	0.80 (13.99)	0.82 (15.25)	0.80 (13.98)	0.73 (11.42)	0.64 (8.73)	0.53 (6.45)	0.40 (4.59)	0.29 (3.13)	2.99	2.68
Real Monetary Base	7.263	5.32	0.07 (0.71)	0.03 (0.33)	0.00 (0.03)	−0.02 (−0.23)	−0.04 (−0.42)	−0.05 (−0.52)	−0.05 (−0.55)	−0.05 (−0.55)	−0.05 (−0.56)	−0.06 (−0.61)	−0.07 (−0.69)	2.28	1.51
M2 Growth Rate	0.921	0.69	0.68 (9.53)	0.62 (8.28)	0.50 (6.01)	0.34 (3.73)	0.16 (1.74)	0.01 (0.13)	−0.17 (−1.80)	−0.31 (−3.38)	−0.39 (−4.35)	−0.41 (−4.60)	−0.38 (−4.25)	3.94	1.79
Monetary Base Growth Rate	3.274	2.45	−0.10 (−1.00)	−0.06 (−0.61)	−0.04 (−0.41)	−0.03 (−0.28)	−0.01 (−0.11)	0.01 (0.13)	0.03 (0.30)	0.04 (0.37)	0.03 (0.30)	0.02 (0.17)	0.00 (0.01)	1.02	0.94
Interest Rates															
Nominal Interest Rate 3 month	12.316	12.18	0.02 (0.14)	0.00 (0.00)	0.02 (0.14)	0.07 (0.67)	0.17 (1.54)	0.26 (2.48)	0.32 (3.12)	0.34 (3.25)	0.31 (2.90)	0.24 (2.25)	0.16 (1.48)	3.55	1.90
Real Nominal Interest Rate 3 month	15.387	15.21	0.02 (0.14)	0.01 (0.05)	−0.01 (−0.07)	0.00 (0.01)	0.05 (0.42)	0.12 (1.12)	0.21 (1.94)	0.28 (2.62)	0.31 (2.95)	0.31 (2.85)	0.26 (2.35)	4.63	1.41
Nominal Treasury Bonds 10 year	12.233	11.30	−0.05 (−0.29)	−0.07 (−0.42)	−0.06 (−0.38)	−0.01 (−0.09)	0.07 (0.42)	0.15 (0.96)	0.21 (1.35)	0.21 (1.33)	0.13 (0.81)	−0.02 (−0.14)	−0.22 (−1.34)	1.56	8.84
Madrid General Stock Market Index	15.904	13.96	0.60 (5.10)	0.60 (5.23)	0.56 (4.67)	0.45 (3.56)	0.30 (2.28)	0.15 (1.10)	−0.02 (−0.17)	−0.18 (−1.32)	−0.30 (−2.18)	−0.34 (−2.53)	−0.32 (−2.33)	3.83	2.85

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 26: Descriptive Statistics for First Differences of Series..1970-1985.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	0.694	1	0.35 (2.84)	0.47 (4.01)	0.53 (4.82)	0.64 (6.41)	0.83 (11.71)	1.00 (−)	0.83 (11.71)	0.64 (6.41)	0.53 (4.82)	0.47 (4.01)	0.35 (2.84)	-	-
Aggregate Consumption	0.765	1.10	0.44 (3.66)	0.52 (4.64)	0.64 (6.40)	0.76 (8.93)	0.83 (11.65)	0.83 (11.60)	0.73 (8.37)	0.60 (5.83)	0.47 (4.08)	0.38 (3.11)	0.37 (2.97)	4.33	0.30
Durables Consumption	2.035	2.93	0.47 (4.02)	0.53 (4.70)	0.64 (6.36)	0.70 (7.51)	0.70 (7.55)	0.59 (5.65)	0.54 (4.92)	0.41 (3.49)	0.24 (1.90)	0.08 (0.59)	0.05 (0.35)	1.96	2.88
Non Durables Consumption	0.708	1.02	0.35 (2.84)	0.44 (3.67)	0.55 (4.95)	0.67 (6.85)	0.75 (8.88)	0.79 (10.04)	0.69 (7.47)	0.58 (5.53)	0.49 (4.23)	0.44 (3.69)	0.43 (3.61)	2.72	0.45
Government Expenditure	0.611	0.88	−0.11 (−0.86)	−0.09 (−0.70)	−0.09 (−0.73)	0.05 (0.42)	0.31 (2.50)	0.56 (5.21)	0.39 (3.28)	0.24 (1.90)	0.23 (1.76)	0.28 (2.22)	0.25 (1.89)	2.52	0.95
Gross Fixed Investment	1.747	2.51	0.14 (1.03)	0.23 (1.82)	0.34 (2.77)	0.50 (4.40)	0.66 (6.87)	0.77 (9.44)	0.70 (7.69)	0.61 (5.94)	0.49 (4.32)	0.34 (2.69)	0.22 (1.65)	1.25	1.42
Change in Inventories	0.361	0.52	−0.03 (−0.21)	0.01 (0.08)	−0.04 (−0.29)	−0.04 (−0.29)	0.17 (1.33)	0.39 (3.32)	0.22 (1.77)	0.01 (0.06)	0.00 (0.03)	0.08 (0.59)	0.01 (0.08)	1.34	1.63
Investment	2.031	2.92	0.10 (0.74)	0.20 (1.53)	0.28 (2.20)	0.41 (3.45)	0.63 (6.26)	0.81 (10.75)	0.69 (7.29)	0.52 (4.68)	0.42 (3.51)	0.32 (2.55)	0.19 (1.47)	0.40	1.22
Exports	1.495	2.15	0.40 (3.24)	0.43 (3.61)	0.35 (2.87)	0.25 (2.01)	0.21 (1.68)	0.24 (1.97)	0.17 (1.32)	0.09 (0.66)	0.02 (0.18)	−0.02 (−0.17)	−0.11 (−0.82)	0.92	0.85
Imports	2.320	3.34	0.20 (1.53)	0.25 (1.93)	0.38 (3.15)	0.52 (4.63)	0.58 (5.56)	0.58 (5.52)	0.53 (4.86)	0.43 (3.68)	0.27 (2.10)	0.09 (0.69)	0.07 (0.56)	0.92	0.85
Net Exports	0.420	0.60	0.00 (0.01)	−0.02 (−0.15)	−0.16 (−1.23)	−0.31 (−2.50)	−0.38 (−3.13)	−0.34 (−2.86)	−0.34 (−2.77)	−0.29 (−2.35)	−0.19 (−1.45)	−0.07 (−0.54)	−0.11 (−0.82)	2.14	5.83
Sectoral Employment and Output															
Agriculture GVA	2.095	3.04	0.05 (0.37)	0.01 (0.05)	0.02 (0.19)	0.10 (0.80)	0.23 (1.87)	0.31 (2.61)	0.20 (1.60)	0.03 (0.21)	−0.05 (−0.37)	−0.01 (−0.11)	0.05 (0.40)	2.11	7.22
Industry GVA	1.160	1.68	0.38 (3.10)	0.47 (4.06)	0.54 (4.89)	0.64 (6.48)	0.79 (10.20)	0.90 (16.53)	0.77 (9.53)	0.63 (6.30)	0.53 (4.86)	0.44 (3.72)	0.28 (2.22)	0.85	3.42
Construction GVA	1.271	1.84	0.23 (1.77)	0.36 (2.93)	0.43 (3.63)	0.50 (4.45)	0.62 (6.18)	0.74 (8.61)	0.66 (6.86)	0.54 (5.02)	0.46 (4.02)	0.39 (3.21)	0.24 (1.90)	0.65	1.83
Non Sale Services GVA	0.417	0.61	−0.30 (−2.38)	−0.19 (−1.47)	−0.02 (−0.17)	0.16 (1.24)	0.32 (2.63)	0.51 (4.64)	0.46 (4.03)	0.40 (3.38)	0.38 (3.15)	0.46 (3.96)	0.52 (4.60)	3.12	2.81
Sale Services GVA	0.547	0.79	0.46 (3.91)	0.58 (5.36)	0.62 (6.13)	0.66 (6.85)	0.77 (9.32)	0.87 (13.87)	0.75 (8.75)	0.63 (6.26)	0.54 (4.96)	0.49 (4.23)	0.41 (3.44)	1.70	1.57
Agricultural Employment	1.126	2.90	−0.01 (−0.04)	0.12 (0.69)	0.24 (1.38)	0.20 (1.16)	0.09 (0.51)	0.17 (1.00)	0.04 (0.21)	−0.03 (−0.20)	−0.05 (−0.27)	0.12 (0.68)	0.10 (0.56)	1.73	0.91
Industrial Employment	0.738	1.90	−0.23 (−1.29)	−0.16 (−0.91)	0.02 (0.11)	−0.02 (−0.11)	−0.01 (−0.08)	−0.11 (−0.65)	0.19 (1.10)	0.41 (2.59)	0.44 (2.77)	0.11 (0.64)	0.14 (0.78)	1.00	3.47
Construction Employment	1.811	4.66	−0.12 (−0.67)	−0.17 (−0.96)	−0.17 (−0.95)	0.08 (0.48)	0.27 (1.63)	0.32 (1.97)	0.20 (1.22)	−0.01 (−0.03)	0.01 (0.03)	−0.16 (−0.89)	−0.25 (−1.43)	0.58	1.74
Services Employment	0.630	1.62	−0.04 (−0.21)	0.09 (0.53)	0.10 (0.58)	0.15 (0.90)	0.11 (0.62)	0.16 (0.98)	0.12 (0.71)	−0.07 (−0.42)	−0.06 (−0.37)	−0.16 (−0.91)	−0.05 (−0.25)	0.28	1.01
Agriculture, Livestock and Fishing Emp.	1.223	3.15	−0.09 (−0.48)	0.16 (0.88)	0.30 (1.78)	0.13 (0.74)	−0.01 (−0.07)	0.20 (1.19)	0.13 (0.74)	−0.08 (−0.44)	−0.14 (−0.82)	0.17 (0.94)	0.20 (1.09)	1.92	1.56
Energy and Water Employment	2.206	5.67	0.12 (0.65)	−0.10 (−0.56)	−0.08 (−0.44)	0.06 (0.34)	0.00 (0.02)	−0.03 (−0.18)	0.17 (0.98)	0.35 (2.17)	0.12 (0.69)	−0.24 (−1.37)	−0.14 (−0.78)	0.23	1.01
Mining and Chemical Employment	1.447	3.72	0.06 (0.32)	−0.29 (−1.71)	−0.25 (−1.44)	−0.02 (−0.11)	−0.03 (−0.15)	−0.31 (−1.94)	0.06 (0.35)	0.33 (2.00)	0.23 (1.33)	−0.03 (−0.16)	−0.04 (−0.19)	2.07	0.85
Metal and Precision Employment	1.653	4.25	−0.21 (−1.17)	−0.17 (−0.95)	−0.01 (−0.04)	0.01 (0.08)	0.01 (0.08)	0.06 (0.38)	0.08 (0.48)	0.20 (1.19)	0.22 (1.26)	0.19 (1.05)	0.13 (0.72)	0.26	0.89
Other Manufacturing Employment	0.866	2.23	−0.06 (−0.31)	0.09 (0.49)	0.04 (0.22)	−0.06 (−0.37)	0.06 (0.36)	0.04 (0.23)	0.13 (0.75)	0.14 (0.84)	0.28 (1.67)	0.19 (1.05)	0.22 (1.26)	0.51	2.56
Construction Employment	1.710	4.40	−0.17 (−0.94)	−0.20 (−1.13)	−0.13 (−0.75)	0.13 (0.76)	0.24 (1.43)	0.28 (1.76)	0.28 (1.68)	0.07 (0.39)	−0.04 (−0.23)	−0.24 (−1.38)	−0.17 (−0.95)	0.81	1.19
Commerce and Hotel Employment	0.748	1.92	−0.10 (−0.55)	0.16 (0.89)	−0.03 (−0.17)	0.05 (0.32)	0.05 (0.26)	0.16 (0.98)	0.15 (0.91)	−0.10 (−0.57)	−0.01 (−0.06)	0.04 (0.23)	0.13 (0.72)	2.01	0.57

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	1.412	3.63	−0.06 (−0.34)	−0.21 (−1.22)	0.05 (0.30)	0.25 (1.46)	0.08 (0.48)	−0.13 (−0.76)	−0.20 (−1.21)	−0.10 (−0.59)	−0.24 (−1.37)	−0.34 (−2.00)	−0.12 (−0.65)	1.12	1.37
Finance and Insurance Employment	2.090	5.38	−0.06 (−0.34)	0.15 (0.87)	0.11 (0.62)	−0.03 (−0.16)	0.28 (1.71)	0.23 (1.37)	0.12 (0.71)	−0.13 (−0.73)	−0.07 (−0.41)	−0.04 (−0.21)	−0.33 (−1.93)	1.17	2.98
Others Services Employment	0.813	2.09	0.18 (0.98)	0.08 (0.44)	0.02 (0.09)	0.09 (0.50)	0.04 (0.20)	0.10 (0.60)	0.05 (0.30)	0.07 (0.42)	0.13 (0.74)	−0.16 (−0.91)	−0.09 (−0.47)	0.59	1.40
General Industrial Production Index	4.268	10.44	−0.19 (−1.19)	−0.24 (−1.50)	0.04 (0.22)	0.05 (0.32)	0.02 (0.11)	0.29 (1.94)	0.24 (1.56)	0.26 (1.65)	0.22 (1.36)	−0.06 (−0.35)	0.11 (0.65)	1.28	2.07
Energy and Water IPI	2.577	6.30	0.15 (0.92)	0.01 (0.09)	−0.17 (−1.04)	0.06 (0.40)	0.07 (0.44)	0.02 (0.14)	0.04 (0.23)	0.10 (0.60)	0.07 (0.46)	−0.19 (−1.19)	−0.32 (−2.04)	1.16	1.51
Mining and Chemical IPI	1.830	4.47	−0.05 (−0.30)	−0.16 (−0.99)	0.13 (0.80)	0.19 (1.24)	−0.06 (−0.37)	−0.02 (−0.13)	0.22 (1.40)	0.26 (1.65)	0.09 (0.57)	−0.03 (−0.18)	0.20 (1.21)	0.71	1.71
Metal and Precision IPI	4.268	10.44	−0.19 (−1.19)	−0.24 (−1.50)	0.04 (0.22)	0.05 (0.32)	0.02 (0.11)	0.29 (1.94)	0.24 (1.56)	0.26 (1.65)	0.22 (1.36)	−0.06 (−0.35)	0.11 (0.65)	1.28	2.07
Other Manufacturing IPI	2.162	5.29	0.07 (0.43)	0.10 (0.61)	0.30 (1.95)	0.17 (1.09)	0.03 (0.16)	0.02 (0.15)	0.11 (0.72)	0.12 (0.77)	0.02 (0.11)	0.02 (0.13)	−0.07 (−0.44)	0.75	0.63
Aggregate Employment and Productivity															
Labour Force	0.540	0.78	0.11 (0.81)	0.11 (0.86)	0.22 (1.70)	0.26 (2.04)	0.36 (2.99)	0.25 (2.06)	0.33 (2.70)	0.32 (2.59)	0.31 (2.46)	0.16 (1.19)	0.18 (1.40)	0.32	2.39
Employment	0.519	0.75	0.29 (2.30)	0.41 (3.43)	0.49 (4.27)	0.59 (5.58)	0.61 (6.01)	0.62 (6.21)	0.65 (6.65)	0.61 (5.93)	0.58 (5.44)	0.47 (4.05)	0.43 (3.54)	0.50	4.11
Government Employment	1.652	4.25	−0.12 (−0.64)	−0.29 (−1.68)	−0.22 (−1.29)	−0.11 (−0.65)	−0.12 (−0.70)	0.17 (1.00)	0.30 (1.81)	0.16 (0.96)	0.04 (0.22)	−0.05 (−0.28)	0.02 (0.11)	1.65	0.93
Activity Rate	0.225	0.58	−0.02 (−0.11)	0.13 (0.71)	0.31 (1.87)	0.48 (3.11)	0.45 (2.93)	0.38 (2.43)	0.26 (1.57)	−0.05 (−0.27)	−0.07 (−0.37)	−0.08 (−0.43)	0.06 (0.32)	2.39	1.38
Unemployment Rate	3.920	5.64	0.26 (1.99)	0.22 (1.73)	0.18 (1.42)	0.01 (0.07)	0.02 (0.18)	−0.04 (−0.27)	−0.04 (−0.33)	−0.02 (−0.14)	−0.05 (−0.39)	−0.03 (−0.25)	−0.04 (−0.30)	1.35	0.03
Average Hours Wage-earners	0.884	1.27	0.02 (0.16)	0.06 (0.46)	0.03 (0.26)	0.07 (0.55)	0.04 (0.33)	−0.02 (−0.14)	0.02 (0.13)	−0.03 (−0.20)	0.02 (0.17)	0.01 (0.05)	−0.02 (−0.15)	0.44	0.18
Average Hours Employees	0.586	1.51	−0.20 (−1.14)	−0.19 (−1.09)	0.11 (0.61)	0.04 (0.22)	−0.07 (−0.41)	0.09 (0.53)	0.12 (0.70)	0.10 (0.57)	−0.15 (−0.85)	−0.19 (−1.06)	−0.21 (−1.19)	0.90	1.67
Total Hours Wage-earners	1.304	1.88	0.30 (2.34)	0.36 (2.91)	0.37 (3.02)	0.42 (3.54)	0.42 (3.63)	0.37 (3.07)	0.35 (2.93)	0.26 (2.04)	0.26 (2.06)	0.22 (1.72)	0.18 (1.35)	0.36	1.48
Total Hours Employees	0.730	1.88	−0.25 (−1.39)	−0.14 (−0.78)	0.18 (1.03)	0.23 (1.37)	0.22 (1.35)	0.33 (2.06)	0.26 (1.59)	0.15 (0.88)	−0.02 (−0.10)	−0.14 (−0.81)	−0.18 (−0.99)	1.00	0.76
Labour Productivity Wage-earners	3.013	4.34	−0.07 (−0.51)	0.00 (0.01)	−0.10 (−0.79)	−0.05 (−0.36)	−0.03 (−0.22)	0.11 (0.85)	0.04 (0.34)	0.02 (0.17)	0.03 (0.20)	−0.02 (−0.15)	0.11 (0.83)	1.30	0.55
Labour Productivity Employees	3.692	9.50	0.12 (0.63)	0.23 (1.33)	−0.21 (−1.24)	−0.05 (−0.26)	0.16 (0.93)	0.18 (1.10)	−0.15 (−0.90)	−0.25 (−1.48)	0.04 (0.20)	0.24 (1.40)	−0.04 (−0.20)	1.16	2.21
Capacity Utilization	1.766	2.56	0.10 (0.79)	0.11 (0.81)	0.27 (2.17)	0.30 (2.48)	0.16 (1.25)	0.12 (0.95)	0.13 (1.03)	0.12 (0.97)	−0.04 (−0.30)	−0.21 (−1.62)	−0.15 (−1.15)	2.39	2.32
Total Factor Productivity (epa)	0.513	1.32	0.28 (1.61)	0.37 (2.18)	−0.08 (−0.47)	−0.19 (−1.14)	0.24 (1.47)	0.47 (3.18)	0.12 (0.73)	−0.24 (−1.41)	−0.04 (−0.20)	0.28 (1.62)	0.13 (0.72)	1.44	2.29
Total Factor Productivity (es)	0.998	1.44	−0.28 (−2.15)	−0.26 (−2.01)	−0.21 (−1.65)	−0.17 (−1.34)	−0.03 (−0.25)	0.14 (1.11)	0.04 (0.31)	−0.03 (−0.21)	−0.12 (−0.91)	−0.14 (−1.03)	−0.19 (−1.43)	0.61	1.76
Vacancies	12.679	32.79	0.01 (0.03)	−0.03 (−0.15)	0.26 (1.47)	0.23 (1.34)	0.19 (1.11)	0.20 (1.17)	0.26 (1.49)	0.22 (1.23)	0.09 (0.47)	0.05 (0.25)	0.20 (1.06)	1.71	0.70
Prices and Wages															
Consumer Price Index	1.306	1.88	−0.55 (−4.91)	−0.52 (−4.55)	−0.42 (−3.52)	−0.38 (−3.18)	−0.33 (−2.70)	−0.27 (−2.22)	−0.20 (−1.59)	−0.06 (−0.45)	0.00 (0.03)	−0.02 (−0.12)	0.02 (0.18)	0.80	1.12
Producer Price Index	1.087	2.66	−0.52 (−3.70)	−0.57 (−4.18)	−0.37 (−2.43)	−0.18 (−1.16)	−0.03 (−0.20)	−0.01 (−0.06)	−0.10 (−0.65)	0.02 (0.12)	0.10 (0.62)	0.11 (0.66)	0.19 (1.19)	3.20	1.43
GDP Price Deflactor	1.166	1.68	−0.58 (−5.36)	−0.59 (−5.49)	−0.43 (−3.61)	−0.32 (−2.58)	−0.29 (−2.38)	−0.31 (−2.59)	−0.17 (−1.30)	−0.01 (−0.06)	0.06 (0.48)	0.06 (0.42)	0.12 (0.87)	1.34	1.96
Inflation Rate (CPI)	1.312	1.89	0.03 (0.21)	0.05 (0.38)	0.10 (0.73)	0.04 (0.28)	0.04 (0.29)	0.04 (0.28)	0.08 (0.65)	0.14 (1.08)	0.06 (0.47)	−0.02 (−0.15)	0.05 (0.34)	0.13	1.41
Inflation Rate (PPI)	0.818	2.00	−0.07 (−0.44)	−0.03 (−0.17)	0.27 (1.73)	0.22 (1.43)	0.18 (1.15)	−0.02 (−0.10)	−0.13 (−0.80)	0.08 (0.49)	0.03 (0.19)	−0.05 (−0.28)	0.10 (0.61)	2.58	1.07

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Inflation Rate (DGDP)	32.252	46.44	0.03 (0.23)	−0.03 (−0.23)	0.23 (1.81)	0.15 (1.19)	0.05 (0.41)	−0.04 (−0.34)	0.21 (1.64)	0.19 (1.50)	0.08 (0.58)	−0.03 (−0.25)	0.09 (0.67)	2.64	2.87
Unitary Labour Cost Index	1.514	2.18	−0.43 (−3.53)	−0.39 (−3.22)	−0.35 (−2.85)	−0.33 (−2.64)	−0.29 (−2.37)	−0.23 (−1.80)	−0.12 (−0.96)	0.02 (0.12)	0.13 (0.99)	0.21 (1.62)	0.28 (2.14)	1.51	4.52
Average Earnings per Hour	1.421	4.92	−0.05 (−0.18)	−0.11 (−0.41)	−0.17 (−0.66)	−0.14 (−0.55)	0.03 (0.13)	−0.10 (−0.43)	−0.18 (−0.73)	−0.04 (−0.14)	−0.35 (−1.42)	0.04 (0.16)	0.46 (1.78)	1.60	1.01
Real Average Earnings per Hour	1.432	4.96	−0.13 (−0.47)	−0.06 (−0.21)	−0.02 (−0.09)	−0.09 (−0.35)	0.09 (0.38)	0.12 (0.48)	0.02 (0.09)	−0.03 (−0.10)	−0.49 (−2.10)	0.15 (0.55)	0.45 (1.74)	2.36	0.76
ULCI Growth Rate	0.460	0.66	0.22 (1.68)	0.23 (1.79)	0.12 (0.92)	0.07 (0.55)	0.06 (0.46)	0.13 (1.04)	0.38 (3.16)	0.45 (3.84)	0.36 (2.98)	0.26 (2.01)	0.23 (1.74)	1.37	3.68
AEH Growth Rate	3.096	10.73	0.22 (0.77)	−0.02 (−0.06)	−0.31 (−1.22)	−0.23 (−0.92)	0.26 (1.07)	−0.10 (−0.41)	−0.04 (−0.17)	0.07 (0.26)	−0.24 (−0.91)	0.28 (1.06)	0.29 (1.06)	0.89	3.61
RAEH Growth Rate	3.410	11.82	0.19 (0.68)	0.04 (0.14)	−0.27 (−1.04)	−0.27 (−1.09)	0.27 (1.11)	−0.03 (−0.12)	−0.06 (−0.23)	−0.04 (−0.16)	−0.27 (−1.07)	0.40 (1.59)	0.18 (0.65)	2.41	3.59
Money															
M2	1.467	2.11	0.17 (1.30)	0.26 (2.07)	0.41 (3.41)	0.43 (3.67)	0.47 (4.10)	0.54 (5.04)	0.58 (5.48)	0.52 (4.66)	0.44 (3.75)	0.41 (3.43)	0.39 (3.16)	1.27	1.13
Monetary Base	3.966	5.71	0.11 (0.80)	0.06 (0.44)	0.00 (0.02)	−0.05 (−0.37)	−0.04 (−0.32)	−0.12 (−0.93)	−0.11 (−0.85)	0.00 (0.01)	0.01 (0.10)	−0.03 (−0.25)	−0.04 (−0.32)	0.71	0.58
Real M2	1.603	2.31	0.56 (5.08)	0.66 (6.58)	0.68 (7.08)	0.63 (6.15)	0.64 (6.48)	0.72 (8.21)	0.61 (5.95)	0.44 (3.74)	0.33 (2.63)	0.31 (2.44)	0.25 (1.95)	3.39	1.37
Real Monetary Base	4.111	5.92	0.26 (2.02)	0.22 (1.69)	0.12 (0.94)	0.04 (0.33)	0.04 (0.34)	−0.02 (−0.19)	−0.06 (−0.46)	0.00 (0.03)	0.00 (−0.03)	−0.05 (−0.36)	−0.07 (−0.53)	0.95	0.44
M2 Growth Rate	0.855	1.23	0.47 (3.92)	0.35 (2.77)	0.26 (2.06)	0.05 (0.40)	0.04 (0.30)	0.06 (0.48)	0.01 (0.10)	−0.10 (−0.76)	−0.12 (−0.93)	−0.04 (−0.33)	−0.03 (−0.22)	4.94	0.50
Monetary Base Growth Rate	4.392	6.30	0.01 (0.11)	−0.04 (−0.29)	−0.05 (−0.38)	−0.05 (−0.35)	0.01 (0.05)	−0.07 (−0.56)	0.01 (0.11)	0.10 (0.73)	0.02 (0.15)	−0.05 (−0.37)	0.00 (0.01)	0.53	1.02

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 27: Descriptive Statistics for Hodrick-Prescott Cyclical Component of Series. 1970-1985.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.490	1.00	0.27 (2.15)	0.48 (4.21)	0.67 (6.89)	0.83 (11.36)	0.95 (23.20)	1.00 (−)	0.95 (23.20)	0.83 (11.36)	0.67 (6.89)	0.48 (4.21)	0.27 (2.15)	-	-
Aggregate Consumption	1.388	0.93	0.40 (3.29)	0.58 (5.41)	0.72 (8.06)	0.82 (11.29)	0.87 (13.69)	0.84 (12.43)	0.75 (8.77)	0.60 (5.84)	0.44 (3.72)	0.28 (2.18)	0.15 (1.11)	5.78	0.15
Durables Consumption	4.266	2.86	0.56 (5.08)	0.68 (7.06)	0.76 (8.88)	0.78 (9.52)	0.74 (8.51)	0.64 (6.58)	0.50 (4.52)	0.31 (2.54)	0.09 (0.69)	−0.14 (−1.04)	−0.31 (−2.42)	3.48	1.16
Non Durables Consumption	1.046	0.70	0.24 (1.89)	0.40 (3.31)	0.54 (4.91)	0.65 (6.71)	0.73 (8.38)	0.75 (8.92)	0.69 (7.45)	0.59 (5.59)	0.47 (4.08)	0.37 (3.03)	0.30 (2.35)	3.02	0.15
Government Expenditure	0.923	0.62	−0.20 (−1.56)	−0.16 (−1.22)	−0.08 (−0.61)	0.05 (0.42)	0.21 (1.67)	0.33 (2.77)	0.37 (3.12)	0.35 (2.94)	0.34 (2.75)	0.34 (2.74)	0.34 (2.77)	1.83	0.45
Gross Fixed Investment	4.846	3.25	0.08 (0.64)	0.29 (2.32)	0.47 (4.15)	0.63 (6.35)	0.76 (9.04)	0.83 (11.55)	0.83 (11.48)	0.77 (9.31)	0.66 (6.81)	0.53 (4.71)	0.38 (3.06)	1.10	0.95
Change in Inventories	0.317	0.21	−0.22 (−1.72)	−0.17 (−1.32)	−0.08 (−0.59)	0.05 (0.40)	0.19 (1.51)	0.29 (2.41)	0.30 (2.47)	0.28 (2.22)	0.26 (2.07)	0.26 (2.07)	0.26 (2.07)	1.11	1.39
Investment	5.435	3.65	0.01 (0.11)	0.22 (1.74)	0.42 (3.51)	0.59 (5.63)	0.73 (8.33)	0.81 (11.02)	0.82 (11.00)	0.76 (8.99)	0.66 (6.83)	0.55 (5.01)	0.42 (3.54)	0.22	0.79
Exports	3.842	2.58	0.44 (3.71)	0.46 (3.91)	0.44 (3.72)	0.39 (3.25)	0.32 (2.63)	0.24 (1.91)	0.12 (0.93)	−0.02 (−0.17)	−0.17 (−1.30)	−0.31 (−2.52)	−0.47 (−4.01)	1.25	3.09
Imports	5.576	3.74	0.22 (1.70)	0.38 (3.11)	0.52 (4.62)	0.62 (6.07)	0.67 (7.07)	0.68 (7.23)	0.63 (6.42)	0.54 (5.03)	0.42 (3.58)	0.30 (2.36)	0.19 (1.50)	2.70	2.34
Net Exports	1.074	0.72	0.05 (0.41)	−0.06 (−0.45)	−0.17 (−1.31)	−0.26 (−2.11)	−0.33 (−2.71)	−0.36 (−3.07)	−0.37 (−3.15)	−0.36 (−3.03)	−0.34 (−2.74)	−0.31 (−2.51)	−0.32 (−2.55)	2.78	3.77
Sectoral Employment and Output															
Agriculture GVA	3.738	2.51	0.01 (0.08)	−0.01 (−0.06)	0.01 (0.07)	0.06 (0.43)	0.11 (0.89)	0.15 (1.23)	0.12 (0.94)	0.06 (0.47)	0.02 (0.15)	0.03 (0.20)	0.07 (0.57)	1.64	2.19
Industry GVA	2.711	1.82	0.33 (2.63)	0.52 (4.64)	0.68 (7.16)	0.81 (10.82)	0.90 (16.43)	0.93 (19.92)	0.87 (13.81)	0.74 (8.61)	0.57 (5.36)	0.36 (2.98)	0.12 (0.91)	0.36	1.66
Construction GVA	3.529	2.37	0.09 (0.64)	0.29 (2.33)	0.47 (4.04)	0.61 (5.93)	0.72 (8.07)	0.79 (10.01)	0.79 (9.98)	0.74 (8.40)	0.64 (6.46)	0.52 (4.62)	0.36 (2.94)	0.75	1.29
Non Sale Services GVA	0.811	0.54	−0.53 (−4.77)	−0.36 (−2.97)	−0.17 (−1.33)	0.03 (0.21)	0.21 (1.69)	0.38 (3.19)	0.50 (4.48)	0.56 (5.20)	0.60 (5.69)	0.64 (6.27)	0.67 (6.82)	4.22	2.92
Sale Services GVA	1.086	0.73	0.20 (1.53)	0.41 (3.39)	0.58 (5.47)	0.72 (7.96)	0.82 (10.99)	0.86 (13.18)	0.82 (11.12)	0.73 (8.20)	0.60 (5.83)	0.46 (3.98)	0.31 (2.43)	1.09	0.66
Agricultural Employment	1.846	2.83	−0.30 (−1.75)	−0.24 (−1.42)	−0.24 (−1.39)	−0.19 (−1.13)	−0.14 (−0.86)	−0.08 (−0.45)	−0.06 (−0.36)	−0.05 (−0.29)	−0.02 (−0.12)	0.03 (0.19)	0.04 (0.20)	1.27	1.03
Industrial Employment	1.612	2.47	−0.14 (−0.80)	−0.04 (−0.21)	0.10 (0.60)	0.24 (1.46)	0.35 (2.19)	0.44 (2.98)	0.54 (3.79)	0.66 (5.06)	0.69 (5.42)	0.61 (4.38)	0.52 (3.43)	1.25	3.37
Construction Employment	4.483	6.86	0.13 (0.73)	0.34 (2.04)	0.49 (3.27)	0.62 (4.57)	0.69 (5.66)	0.70 (5.82)	0.60 (4.46)	0.48 (3.16)	0.35 (2.13)	0.20 (1.16)	0.07 (0.39)	1.86	1.82
Services Employment	1.438	2.20	0.33 (1.97)	0.52 (3.42)	0.59 (4.18)	0.60 (4.36)	0.57 (4.07)	0.51 (3.57)	0.39 (2.52)	0.27 (1.62)	0.16 (0.93)	0.07 (0.38)	0.04 (0.22)	1.50	0.61
Agriculture, Livestock and Fishing Emp.	1.879	2.88	−0.28 (−1.64)	−0.21 (−1.23)	−0.20 (−1.20)	−0.18 (−1.08)	−0.14 (−0.85)	−0.06 (−0.35)	−0.04 (−0.25)	−0.06 (−0.34)	−0.04 (−0.25)	0.04 (0.22)	0.05 (0.27)	1.63	1.74
Energy and Water Employment	2.340	3.58	−0.13 (−0.70)	−0.12 (−0.67)	−0.11 (−0.63)	−0.05 (−0.28)	−0.09 (−0.51)	0.04 (0.21)	0.20 (1.20)	0.25 (1.53)	0.12 (0.68)	−0.12 (−0.66)	−0.27 (−1.54)	0.62	1.03
Mining and Chemical Employment	1.849	2.83	−0.14 (−0.81)	−0.15 (−0.89)	−0.05 (−0.26)	0.08 (0.45)	0.15 (0.89)	0.19 (1.13)	0.33 (2.09)	0.50 (3.39)	0.53 (3.63)	0.44 (2.75)	0.37 (2.19)	1.67	1.49
Metal and Precision Employment	2.455	3.76	−0.27 (−1.57)	−0.23 (−1.36)	−0.02 (−0.11)	0.23 (1.39)	0.35 (2.24)	0.47 (3.23)	0.53 (3.69)	0.60 (4.40)	0.59 (4.22)	0.50 (3.23)	0.32 (1.91)	0.55	1.04
Other Manufacturing Employment	1.728	2.65	0.30 (1.78)	0.36 (2.20)	0.38 (2.37)	0.38 (2.37)	0.43 (2.79)	0.46 (3.15)	0.48 (3.22)	0.53 (3.60)	0.58 (4.12)	0.60 (4.23)	0.60 (4.22)	0.84	3.15
Construction Employment	4.479	6.86	0.17 (0.97)	0.37 (2.26)	0.53 (3.55)	0.65 (4.96)	0.71 (5.95)	0.71 (5.99)	0.62 (4.69)	0.49 (3.30)	0.35 (2.13)	0.20 (1.14)	0.08 (0.47)	2.41	1.30
Commerce and Hotel Employment	1.885	2.89	0.54 (3.56)	0.61 (4.41)	0.60 (4.35)	0.59 (4.22)	0.55 (3.93)	0.51 (3.58)	0.42 (2.72)	0.32 (2.00)	0.27 (1.59)	0.23 (1.33)	0.21 (1.20)	2.39	0.45

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.341	3.58	0.11 (0.64)	0.15 (0.86)	0.20 (1.20)	0.22 (1.31)	0.13 (0.79)	−0.04 (−0.24)	−0.21 (−1.29)	−0.33 (−2.01)	−0.42 (−2.64)	−0.44 (−2.78)	−0.31 (−1.83)	1.39	1.86
Finance and Insurance Employment	2.768	4.24	0.34 (2.03)	0.57 (3.89)	0.66 (5.07)	0.66 (5.19)	0.70 (5.78)	0.65 (5.16)	0.48 (3.24)	0.28 (1.67)	0.12 (0.69)	−0.04 (−0.25)	−0.20 (−1.13)	2.89	1.10
Others Services Employment	1.174	1.80	0.01 (0.06)	0.25 (1.49)	0.40 (2.51)	0.48 (3.23)	0.51 (3.51)	0.51 (3.59)	0.45 (3.01)	0.38 (2.43)	0.28 (1.69)	0.11 (0.61)	0.01 (0.03)	0.88	1.66
General Industrial Production Index	4.669	7.36	−0.11 (−0.66)	−0.03 (−0.16)	0.18 (1.13)	0.38 (2.58)	0.52 (3.89)	0.61 (5.04)	0.60 (4.85)	0.56 (4.27)	0.40 (2.74)	0.14 (0.86)	0.13 (0.79)	1.19	1.28
Energy and Water IPI	2.209	3.48	0.17 (1.04)	0.14 (0.90)	0.03 (0.21)	0.12 (0.78)	0.10 (0.63)	−0.07 (−0.43)	−0.07 (−0.42)	−0.18 (−1.14)	−0.35 (−2.32)	−0.50 (−3.59)	−0.46 (−3.15)	1.37	2.57
IMining and Chemical IPI	2.032	3.20	−0.16 (−1.02)	−0.14 (−0.85)	0.03 (0.18)	0.13 (0.82)	0.07 (0.48)	−0.01 (−0.05)	0.14 (0.90)	0.19 (1.24)	0.16 (1.04)	0.19 (1.17)	0.36 (2.36)	0.62	1.50
Metal and Precision IPI	4.669	7.36	−0.11 (−0.66)	−0.03 (−0.16)	0.18 (1.13)	0.38 (2.58)	0.52 (3.89)	0.61 (5.04)	0.60 (4.85)	0.56 (4.27)	0.40 (2.74)	0.14 (0.86)	0.13 (0.79)	1.19	1.28
Other Manufacturing IPI	2.189	3.45	0.27 (1.71)	0.35 (2.32)	0.42 (2.91)	0.43 (2.98)	0.35 (2.37)	0.24 (1.60)	0.28 (1.88)	0.26 (1.72)	0.23 (1.45)	0.22 (1.38)	0.25 (1.56)	0.96	0.94
Aggregate Employment and Productivity															
Labour Force	0.762	0.51	0.03 (0.23)	0.22 (1.75)	0.42 (3.54)	0.58 (5.57)	0.71 (7.92)	0.78 (9.68)	0.81 (10.60)	0.78 (9.52)	0.69 (7.28)	0.53 (4.75)	0.36 (2.90)	1.45	3.95
Employment	1.070	0.72	−0.06 (−0.49)	0.18 (1.40)	0.38 (3.14)	0.53 (4.82)	0.63 (6.30)	0.68 (7.40)	0.70 (7.57)	0.67 (6.93)	0.59 (5.60)	0.47 (4.04)	0.32 (2.59)	1.18	0.54
Government Employment	1.917	2.93	−0.15 (−0.83)	−0.15 (−0.88)	−0.04 (−0.24)	0.10 (0.60)	0.14 (0.86)	0.20 (1.20)	0.28 (1.73)	0.19 (1.12)	0.04 (0.24)	−0.11 (−0.62)	−0.19 (−1.09)	0.82	1.05
Activity Rate	0.486	0.74	0.17 (0.99)	0.40 (2.49)	0.61 (4.47)	0.77 (7.01)	0.82 (8.49)	0.79 (7.82)	0.70 (5.74)	0.56 (3.92)	0.45 (2.89)	0.36 (2.15)	0.27 (1.57)	4.28	1.56
Unemployment Rate	6.482	4.35	0.70 (7.41)	0.69 (7.23)	0.61 (5.96)	0.49 (4.35)	0.37 (3.08)	0.23 (1.88)	0.07 (0.58)	−0.11 (−0.88)	−0.25 (−1.98)	−0.36 (−2.94)	−0.43 (−3.58)	1.18	0.54
Average Hours Wage-earners	0.764	0.51	0.11 (0.84)	0.17 (1.29)	0.17 (1.35)	0.20 (1.55)	0.19 (1.54)	0.16 (1.25)	0.12 (0.96)	0.11 (0.88)	0.11 (0.84)	0.10 (0.73)	0.08 (0.58)	0.45	0.23
Average Hours Employees	0.724	1.11	0.13 (0.75)	0.22 (1.29)	0.37 (2.31)	0.41 (2.63)	0.33 (2.08)	0.18 (1.12)	0.04 (0.21)	−0.15 (−0.89)	−0.34 (−2.11)	−0.47 (−3.03)	−0.49 (−3.17)	1.73	1.44
Total Hours Wage-earners	1.774	1.19	0.16 (1.23)	0.25 (2.00)	0.31 (2.52)	0.35 (2.88)	0.35 (2.94)	0.32 (2.69)	0.25 (2.05)	0.18 (1.45)	0.11 (0.85)	0.04 (0.30)	−0.02 (−0.13)	0.64	0.37
Total Hours Employees	1.520	2.33	0.17 (0.95)	0.40 (2.50)	0.59 (4.20)	0.68 (5.35)	0.69 (5.65)	0.65 (5.08)	0.53 (3.67)	0.37 (2.34)	0.21 (1.22)	0.06 (0.32)	−0.04 (−0.23)	2.65	0.28
Labour Productivity Wage-earners	2.417	1.62	−0.13 (−0.99)	−0.10 (−0.80)	−0.07 (−0.53)	−0.01 (−0.08)	0.06 (0.50)	0.18 (1.42)	0.25 (2.05)	0.27 (2.19)	0.26 (2.03)	0.24 (1.85)	0.18 (1.37)	1.82	0.29
Labour Productivity Employees	2.750	4.21	0.06 (0.31)	0.09 (0.48)	−0.13 (−0.72)	−0.11 (−0.66)	0.04 (0.21)	0.14 (0.83)	0.06 (0.38)	0.08 (0.44)	0.24 (1.41)	0.36 (2.20)	0.29 (1.66)	3.19	2.63
Capacity Utilization	2.390	1.60	0.39 (3.18)	0.48 (4.17)	0.56 (5.25)	0.57 (5.37)	0.50 (4.52)	0.40 (3.47)	0.29 (2.38)	0.12 (0.97)	−0.07 (−0.56)	−0.27 (−2.11)	−0.42 (−3.53)	3.44	2.39
Total Factor Productivity (epa)	0.791	1.21	0.04 (0.24)	−0.10 (−0.59)	−0.29 (−1.71)	−0.32 (−1.95)	−0.17 (−1.02)	0.02 (0.14)	0.07 (0.41)	0.07 (0.41)	0.16 (0.93)	0.29 (1.70)	0.31 (1.83)	2.41	2.94
Total Factor Productivity (es)	1.422	0.95	0.04 (0.33)	0.15 (1.18)	0.28 (2.25)	0.39 (3.26)	0.49 (4.38)	0.58 (5.54)	0.61 (6.01)	0.55 (5.09)	0.45 (3.85)	0.33 (2.63)	0.18 (1.37)	0.74	1.47
Vacancies	19.959	30.30	0.08 (0.43)	0.07 (0.41)	0.19 (1.09)	0.22 (1.25)	0.14 (0.79)	0.07 (0.40)	0.12 (0.69)	0.13 (0.71)	0.15 (0.86)	0.25 (1.40)	0.41 (2.42)	0.91	0.51
Prices and Wages															
Consumer Price Index	1.655	1.11	−0.39 (−3.17)	−0.32 (−2.61)	−0.25 (−2.02)	−0.19 (−1.53)	−0.13 (−1.01)	−0.07 (−0.52)	−0.01 (−0.05)	0.04 (0.34)	0.08 (0.64)	0.09 (0.67)	0.08 (0.63)	1.04	0.78
Producer Price Index	2.323	3.66	−0.79 (−7.92)	−0.75 (−7.07)	−0.63 (−5.01)	−0.47 (−3.36)	−0.33 (−2.27)	−0.25 (−1.70)	−0.19 (−1.27)	−0.15 (−0.96)	−0.11 (−0.68)	−0.08 (−0.50)	−0.07 (−0.42)	4.08	1.21
GDP Price Deflactor	1.664	1.12	−0.50 (−4.35)	−0.43 (−3.59)	−0.32 (−2.63)	−0.23 (−1.81)	−0.15 (−1.18)	−0.08 (−0.67)	0.02 (0.14)	0.11 (0.84)	0.16 (1.23)	0.17 (1.32)	0.18 (1.37)	1.66	1.13
Inflation Rate (CPI)	0.896	0.60	−0.08 (−0.57)	0.00 (−0.02)	0.04 (0.28)	0.04 (0.30)	0.07 (0.52)	0.08 (0.63)	0.11 (0.83)	0.09 (0.69)	0.07 (0.55)	0.00 (0.04)	−0.01 (−0.09)	0.33	1.01
Inflation Rate (PPI)	0.857	1.35	−0.19 (−1.18)	0.06 (0.39)	0.26 (1.69)	0.38 (2.60)	0.35 (2.37)	0.16 (1.02)	0.03 (0.18)	0.03 (0.21)	0.01 (0.04)	−0.05 (−0.32)	−0.10 (−0.62)	2.65	1.17

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Inflation Rate (DGDP)	26.743	17.95	0.09 (0.66)	0.16 (1.22)	0.26 (2.03)	0.25 (1.96)	0.21 (1.67)	0.16 (1.28)	0.23 (1.89)	0.18 (1.43)	0.08 (0.62)	0.00 (0.01)	0.02 (0.18)	3.70	2.18
Unitary Labour Cost Index	2.510	1.68	−0.39 (−3.17)	−0.36 (−2.97)	−0.35 (−2.82)	−0.32 (−2.65)	−0.29 (−2.36)	−0.23 (−1.90)	−0.16 (−1.28)	−0.06 (−0.48)	0.04 (0.34)	0.15 (1.13)	0.25 (1.91)	1.21	1.66
Average Earnings per Hour	1.302	2.69	−0.58 (−2.54)	−0.53 (−2.32)	−0.45 (−1.93)	−0.35 (−1.52)	0.00 (−0.02)	0.23 (1.02)	0.27 (1.16)	0.38 (1.65)	0.45 (1.93)	0.55 (2.46)	0.73 (3.82)	1.60	2.64
Real Average Earnings per Hour	1.146	2.37	−0.48 (−1.97)	−0.48 (−2.05)	−0.39 (−1.66)	−0.31 (−1.32)	−0.02 (−0.09)	0.20 (0.86)	0.17 (0.71)	0.18 (0.72)	0.22 (0.87)	0.39 (1.57)	0.61 (2.74)	7.06	2.05
ULCI Growth Rate	0.591	0.40	−0.09 (−0.65)	−0.04 (−0.34)	−0.03 (−0.25)	0.01 (0.05)	0.09 (0.67)	0.20 (1.61)	0.33 (2.75)	0.44 (3.78)	0.46 (4.03)	0.44 (3.78)	0.42 (3.53)	0.80	2.23
AEH Growth Rate	2.400	4.96	0.03 (0.10)	0.10 (0.36)	0.06 (0.23)	0.01 (0.02)	0.34 (1.49)	0.34 (1.53)	0.09 (0.38)	0.16 (0.63)	0.11 (0.43)	0.05 (0.20)	0.23 (0.84)	1.70	3.85
RAEH Growth Rate	2.581	5.34	0.02 (0.06)	0.08 (0.32)	0.06 (0.22)	−0.01 (−0.04)	0.29 (1.26)	0.32 (1.44)	0.00 (0.01)	0.04 (0.15)	0.06 (0.25)	0.13 (0.50)	0.20 (0.73)	2.28	2.05
Money															
M2	3.388	2.27	0.32 (2.52)	0.53 (4.71)	0.68 (7.12)	0.77 (9.31)	0.81 (10.67)	0.80 (10.53)	0.74 (8.64)	0.64 (6.51)	0.52 (4.62)	0.37 (3.00)	0.20 (1.51)	2.66	0.43
Monetary Base	7.355	4.94	0.12 (0.92)	0.04 (0.27)	−0.03 (−0.23)	−0.07 (−0.56)	−0.09 (−0.69)	−0.09 (−0.72)	−0.06 (−0.49)	−0.02 (−0.15)	0.02 (0.13)	0.04 (0.27)	0.05 (0.41)	0.45	0.57
Real M2	3.518	2.36	0.54 (4.84)	0.71 (7.58)	0.80 (10.41)	0.85 (12.28)	0.85 (12.51)	0.81 (10.92)	0.71 (7.84)	0.57 (5.31)	0.41 (3.41)	0.24 (1.91)	0.07 (0.54)	2.18	0.72
Real Monetary Base	7.321	4.91	0.25 (1.99)	0.14 (1.09)	0.05 (0.36)	−0.02 (−0.16)	−0.05 (−0.42)	−0.07 (−0.57)	−0.07 (−0.53)	−0.04 (−0.34)	−0.02 (−0.14)	0.00 (−0.02)	0.01 (0.10)	0.57	0.43
M2 Growth Rate	1.028	0.69	0.72 (7.70)	0.59 (5.58)	0.44 (3.78)	0.25 (1.97)	0.08 (0.64)	−0.07 (−0.53)	−0.34 (−2.77)	−0.51 (−4.51)	−0.58 (−5.40)	−0.57 (−5.28)	−0.54 (−4.78)	5.49	2.36
Monetary Base Growth Rate	3.752	2.53	−0.14 (−1.05)	−0.15 (−1.15)	−0.14 (−1.05)	−0.10 (−0.77)	−0.05 (−0.35)	−0.02 (−0.14)	0.03 (0.24)	0.07 (0.57)	0.05 (0.37)	0.03 (0.23)	0.02 (0.13)	0.40	0.58

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 28: Descriptive Statistics for Baxter-King Cyclical Componets of Series.
1970-1985.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.527	1	0.34 (2.69)	0.52 (4.66)	0.70 (7.53)	0.85 (12.72)	0.96 (27.33)	1.00 (−)	0.96 (27.33)	0.85 (12.72)	0.70 (7.53)	0.52 (4.66)	0.34 (2.69)	-	-
Aggregate Consumption	1.517	0.99	0.47 (4.04)	0.63 (6.12)	0.75 (8.76)	0.84 (12.00)	0.88 (14.46)	0.86 (13.30)	0.76 (9.27)	0.63 (6.25)	0.49 (4.27)	0.36 (2.93)	0.26 (2.00)	1.63	0.37
Durables Consumption	4.316	2.82	0.63 (6.07)	0.76 (8.78)	0.83 (11.26)	0.84 (12.04)	0.80 (10.35)	0.70 (7.76)	0.55 (5.10)	0.37 (3.04)	0.17 (1.35)	−0.01 (−0.11)	−0.18 (−1.42)	2.85	1.33
Non Durables Consumption	1.200	0.78	0.35 (2.79)	0.47 (4.00)	0.58 (5.43)	0.68 (7.13)	0.75 (8.78)	0.76 (9.35)	0.69 (7.43)	0.58 (5.57)	0.50 (4.38)	0.43 (3.67)	0.40 (3.27)	1.21	0.38
Government Expenditure	1.004	0.65	−0.06 (−0.45)	−0.04 (−0.29)	0.02 (0.19)	0.13 (1.05)	0.27 (2.18)	0.38 (3.24)	0.35 (2.89)	0.32 (2.63)	0.33 (2.68)	0.36 (2.98)	0.42 (3.47)	3.52	1.50
Gross Fixed Investment	4.720	3.09	0.13 (0.98)	0.32 (2.62)	0.51 (4.56)	0.67 (6.98)	0.78 (9.68)	0.82 (11.14)	0.83 (11.69)	0.78 (9.54)	0.67 (6.97)	0.54 (4.90)	0.40 (3.30)	3.86	1.71
Change in Inventories	0.304	0.19	−0.18 (−1.40)	−0.16 (−1.21)	−0.07 (−0.57)	0.04 (0.32)	0.15 (1.22)	0.23 (1.87)	0.26 (2.09)	0.25 (2.01)	0.23 (1.77)	0.21 (1.61)	0.22 (1.71)	0.42	2.00
Investment	5.213	3.41	0.07 (0.50)	0.26 (2.05)	0.46 (3.93)	0.63 (6.27)	0.75 (8.86)	0.80 (10.45)	0.82 (11.25)	0.77 (9.37)	0.67 (6.98)	0.55 (5.07)	0.44 (3.66)	2.98	1.98
Exports	3.694	2.41	0.41 (3.40)	0.42 (3.54)	0.40 (3.40)	0.37 (3.08)	0.32 (2.68)	0.27 (2.25)	0.12 (0.98)	−0.02 (−0.16)	−0.15 (−1.18)	−0.29 (−2.27)	−0.43 (−3.62)	3.26	3.14
Imports	5.407	3.54	0.27 (2.12)	0.42 (3.52)	0.55 (5.02)	0.65 (6.54)	0.70 (7.55)	0.68 (7.36)	0.62 (6.16)	0.53 (4.79)	0.42 (3.59)	0.33 (2.64)	0.25 (1.94)	1.94	1.59
Net Exports	1.034	0.68	−0.01 (−0.11)	−0.12 (−0.92)	−0.22 (−1.73)	−0.30 (−2.47)	−0.36 (−2.98)	−0.37 (−3.10)	−0.38 (−3.19)	−0.36 (−3.01)	−0.34 (−2.78)	−0.33 (−2.67)	−0.35 (−2.80)	3.26	1.44
Sectoral Employment and Output															
Agriculture GVA	3.838	2.51	0.03 (0.25)	0.00 (−0.01)	0.01 (0.04)	0.05 (0.36)	0.11 (0.82)	0.16 (1.30)	0.14 (1.11)	0.09 (0.66)	0.03 (0.24)	0.02 (0.12)	0.06 (0.42)	2.78	2.85
Industry GVA	2.733	1.79	0.33 (2.66)	0.52 (4.66)	0.69 (7.37)	0.83 (11.50)	0.91 (17.47)	0.93 (19.65)	0.89 (15.21)	0.78 (9.77)	0.62 (6.13)	0.43 (3.59)	0.20 (1.57)	4.86	2.82
Construction GVA	3.383	2.22	0.17 (1.29)	0.36 (2.90)	0.52 (4.73)	0.66 (6.81)	0.75 (8.82)	0.78 (9.73)	0.78 (9.71)	0.73 (8.27)	0.64 (6.35)	0.51 (4.53)	0.36 (2.93)	1.19	0.22
Non Sale Services GVA	0.845	0.55	−0.43 (−3.55)	−0.25 (−1.94)	−0.05 (−0.36)	0.15 (1.16)	0.31 (2.53)	0.42 (3.65)	0.54 (4.97)	0.59 (5.71)	0.62 (6.07)	0.64 (6.37)	0.67 (6.78)	4.87	9.58
Sale Services GVA	1.153	0.76	0.32 (2.53)	0.50 (4.43)	0.67 (6.86)	0.79 (10.01)	0.86 (13.34)	0.88 (14.25)	0.84 (12.17)	0.76 (8.93)	0.63 (6.20)	0.48 (4.12)	0.32 (2.52)	1.77	0.36
Agricultural Employment	1.892	2.35	−0.31 (−1.81)	−0.29 (−1.72)	−0.26 (−1.57)	−0.24 (−1.42)	−0.21 (−1.29)	−0.18 (−1.12)	−0.17 (−1.01)	−0.15 (−0.89)	−0.12 (−0.72)	−0.10 (−0.60)	−0.12 (−0.66)	5.56	0.28
Industrial Employment	1.483	1.84	0.00 (−0.02)	0.12 (0.68)	0.25 (1.51)	0.37 (2.34)	0.48 (3.23)	0.58 (4.33)	0.67 (5.39)	0.76 (6.74)	0.80 (7.61)	0.78 (7.07)	0.71 (5.60)	0.52	3.94
Construction Employment	4.496	5.58	0.27 (1.55)	0.44 (2.79)	0.58 (4.10)	0.68 (5.35)	0.72 (6.14)	0.72 (6.15)	0.65 (5.03)	0.55 (3.81)	0.44 (2.79)	0.34 (2.03)	0.26 (1.49)	4.12	3.23
Services Employment	1.361	1.69	0.44 (2.70)	0.55 (3.76)	0.60 (4.33)	0.61 (4.53)	0.59 (4.36)	0.54 (3.86)	0.45 (2.95)	0.35 (2.14)	0.26 (1.52)	0.20 (1.15)	0.19 (1.07)	2.89	1.38
Agriculture, Livestock and Fishing Emp.	1.884	2.34	−0.28 (−1.60)	−0.26 (−1.54)	−0.24 (−1.42)	−0.22 (−1.29)	−0.20 (−1.18)	−0.17 (−1.02)	−0.16 (−0.96)	−0.15 (−0.86)	−0.12 (−0.71)	−0.10 (−0.59)	−0.12 (−0.66)	5.50	0.27
Energy and Water Employment	1.942	2.41	−0.11 (−0.60)	−0.12 (−0.67)	−0.11 (−0.64)	−0.09 (−0.52)	−0.06 (−0.33)	−0.01 (−0.09)	0.08 (0.49)	0.10 (0.56)	−0.01 (−0.03)	−0.20 (−1.14)	−0.42 (−2.59)	2.36	4.50
Mining and Chemical Employment	1.695	2.10	−0.12 (−0.69)	−0.04 (−0.23)	0.05 (0.31)	0.15 (0.90)	0.25 (1.55)	0.36 (2.31)	0.47 (3.17)	0.58 (4.16)	0.64 (4.81)	0.64 (4.70)	0.58 (3.94)	2.13	8.75
Metal and Precision Employment	2.388	2.96	−0.09 (−0.50)	0.01 (0.05)	0.18 (1.04)	0.35 (2.15)	0.48 (3.19)	0.58 (4.24)	0.63 (4.83)	0.67 (5.28)	0.66 (5.08)	0.58 (4.06)	0.44 (2.74)	3.51	1.89
Other Manufacturing Employment	1.700	2.11	0.43 (2.64)	0.48 (3.07)	0.51 (3.37)	0.53 (3.64)	0.56 (4.02)	0.61 (4.60)	0.64 (4.89)	0.68 (5.46)	0.73 (6.20)	0.77 (6.94)	0.80 (7.31)	0.82	2.10
Construction Employment	4.535	5.63	0.32 (1.87)	0.48 (3.10)	0.61 (4.43)	0.70 (5.71)	0.74 (6.51)	0.73 (6.44)	0.66 (5.17)	0.55 (3.88)	0.44 (2.83)	0.34 (2.05)	0.26 (1.50)	3.72	3.17
Commerce and Hotel Employment	1.769	2.20	0.64 (4.61)	0.64 (4.77)	0.64 (4.81)	0.63 (4.78)	0.61 (4.58)	0.58 (4.23)	0.51 (3.47)	0.44 (2.86)	0.39 (2.44)	0.37 (2.23)	0.37 (2.20)	2.20	0.41

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are H_0 : x_t show no Granger causality to y_t y H_0 : y_t show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.141	2.66	0.09	0.15	0.17	0.15	0.07	−0.05	−0.19	−0.32	−0.38	−0.35	−0.21	1.04	6.20
			(0.48)	(0.85)	(1.02)	(0.90)	(0.44)	(−0.27)	(−1.17)	(−1.98)	(−2.39)	(−2.11)	(−1.20)		
Finance and Insurance Employment	2.584	3.21	0.49	0.64	0.73	0.77	0.76	0.68	0.54	0.37	0.20	0.06	−0.02	5.40	1.61
			(3.13)	(4.66)	(6.15)	(7.08)	(6.82)	(5.55)	(3.83)	(2.36)	(1.20)	(0.36)	(−0.09)		
Others Services Employment	1.155	1.43	0.13	0.33	0.45	0.51	0.54	0.53	0.48	0.41	0.31	0.20	0.11	2.25	2.69
			(0.71)	(1.96)	(2.89)	(3.46)	(3.76)	(3.72)	(3.23)	(2.59)	(1.86)	(1.16)	(0.62)		
General Industrial Production Index	1.359	1.75	0.23	0.35	0.49	0.63	0.75	0.78	0.77	0.69	0.58	0.48	0.39	6.07	4.39
			(1.47)	(2.34)	(3.49)	(5.11)	(7.25)	(8.08)	(7.67)	(5.97)	(4.50)	(3.34)	(2.61)		
Energy and Water IPI	1.613	2.08	0.25	0.19	0.11	0.05	0.00	−0.06	−0.14	−0.29	−0.46	−0.57	−0.53	3.67	19.22
			(1.60)	(1.19)	(0.67)	(0.30)	(0.03)	(−0.39)	(−0.91)	(−1.94)	(−3.26)	(−4.27)	(−3.83)		
Mining and Chemical IPI	1.496	1.93	−0.11	−0.08	0.00	0.10	0.17	0.17	0.24	0.28	0.33	0.39	0.47	6.07	1.13
			(−0.70)	(−0.48)	(0.00)	(0.61)	(1.11)	(1.10)	(1.55)	(1.83)	(2.15)	(2.61)	(3.23)		
Metal and Precision IPI	3.958	5.09	−0.03	0.08	0.25	0.44	0.63	0.74	0.75	0.67	0.53	0.38	0.22	3.44	3.20
			(−0.19)	(0.52)	(1.59)	(3.09)	(5.14)	(7.06)	(7.25)	(5.66)	(3.94)	(2.51)	(1.40)		
Other Manufacturing IPI	1.834	2.36	0.36	0.46	0.52	0.54	0.51	0.42	0.38	0.36	0.36	0.37	0.40	5.88	5.97
			(2.32)	(3.17)	(3.78)	(4.01)	(3.77)	(2.98)	(2.65)	(2.45)	(2.44)	(2.49)	(2.63)		
Aggregate Employment and Productivity															
Labour Force	0.704	0.46	0.06	0.25	0.45	0.62	0.75	0.81	0.83	0.79	0.70	0.57	0.38	1.90	4.96
			(0.46)	(2.00)	(3.86)	(6.14)	(8.79)	(10.97)	(11.49)	(9.96)	(7.58)	(5.22)	(3.10)		
Employment	1.152	0.75	0.08	0.28	0.44	0.57	0.65	0.69	0.69	0.67	0.60	0.50	0.37	2.00	2.43
			(0.63)	(2.18)	(3.80)	(5.40)	(6.75)	(7.40)	(7.53)	(6.90)	(5.76)	(4.37)	(2.97)		
Government Employment	1.694	2.10	−0.15	−0.11	−0.05	0.05	0.16	0.19	0.23	0.17	0.04	−0.08	−0.15	9.64	1.62
			(−0.84)	(−0.65)	(−0.28)	(0.31)	(0.93)	(1.16)	(1.39)	(0.98)	(0.22)	(−0.46)	(−0.83)		
Activity Rate	0.494	0.61	0.34	0.54	0.71	0.82	0.85	0.81	0.72	0.61	0.50	0.40	0.32	7.12	1.36
			(2.00)	(3.60)	(5.87)	(8.47)	(9.58)	(8.36)	(6.18)	(4.46)	(3.29)	(2.49)	(1.88)		
Unemployment Rate	6.693	4.38	0.46	0.45	0.39	0.31	0.23	0.18	0.03	−0.13	−0.26	−0.36	−0.41	2.04	1.50
			(3.94)	(3.88)	(3.27)	(2.50)	(1.85)	(1.46)	(0.25)	(−1.00)	(−2.09)	(−2.89)	(−3.38)		
Average Hours Wage-earners	0.596	0.39	0.13	0.16	0.19	0.20	0.19	0.15	0.11	0.08	0.08	0.09	0.08	1.18	1.02
			(1.01)	(1.23)	(1.45)	(1.56)	(1.48)	(1.21)	(0.84)	(0.62)	(0.58)	(0.66)	(0.62)		
Average Hours Employees	0.671	0.83	0.08	0.16	0.25	0.32	0.30	0.17	0.03	−0.15	−0.31	−0.41	−0.41	5.20	1.25
			(0.46)	(0.93)	(1.51)	(1.94)	(1.87)	(1.06)	(0.15)	(−0.91)	(−1.89)	(−2.52)	(−2.52)		
Total Hours Wage-earners	1.927	1.26	0.36	0.40	0.44	0.45	0.44	0.39	0.32	0.25	0.18	0.12	0.07	2.47	1.68
			(2.88)	(3.34)	(3.74)	(3.92)	(3.79)	(3.33)	(2.66)	(2.02)	(1.44)	(0.96)	(0.54)		
Total Hours Employees	1.548	1.92	0.29	0.47	0.60	0.69	0.72	0.67	0.57	0.44	0.31	0.21	0.15	4.03	2.51
			(1.70)	(2.99)	(4.35)	(5.57)	(6.09)	(5.48)	(4.12)	(2.87)	(1.89)	(1.21)	(0.82)		
Labour Productivity Wage-earners	1.768	1.16	−0.17	−0.08	0.01	0.10	0.18	0.24	0.32	0.34	0.30	0.23	0.15	2.75	1.63
			(−1.30)	(−0.63)	(0.05)	(0.75)	(1.41)	(1.97)	(2.66)	(2.80)	(2.45)	(1.83)	(1.17)		
Labour Productivity Employees	1.378	1.71	0.51	0.32	0.16	0.07	0.06	0.12	0.16	0.18	0.19	0.18	0.17	5.82	2.31
			(3.29)	(1.92)	(0.91)	(0.38)	(0.35)	(0.71)	(0.94)	(1.06)	(1.09)	(1.06)	(0.97)		
Capacity Utilization	2.245	1.47	0.37	0.50	0.58	0.60	0.55	0.44	0.32	0.15	−0.03	−0.22	−0.39	4.02	2.43
			(3.01)	(4.43)	(5.50)	(5.81)	(5.15)	(3.81)	(2.60)	(1.20)	(−0.26)	(−1.74)	(−3.25)		
Total Factor Productivity (epa)	0.760	0.94	0.04	−0.14	−0.23	−0.23	−0.18	−0.08	0.01	0.06	0.08	0.10	0.12	2.08	4.69
			(0.24)	(−0.79)	(−1.35)	(−1.41)	(−1.06)	(−0.46)	(0.07)	(0.33)	(0.46)	(0.57)	(0.66)		
Total Factor Productivity (es)	1.415	0.93	−0.03	0.10	0.22	0.33	0.43	0.48	0.50	0.46	0.37	0.26	0.13	3.46	2.67
			(−0.19)	(0.76)	(1.74)	(2.75)	(3.68)	(4.33)	(4.52)	(4.03)	(3.10)	(2.03)	(0.99)		
Vacancies	18.201	22.71	0.10	0.18	0.22	0.23	0.19	0.12	0.14	0.16	0.21	0.31	0.43	4.53	1.29
			(0.56)	(0.98)	(1.27)	(1.31)	(1.08)	(0.70)	(0.83)	(0.93)	(1.20)	(1.76)	(2.54)		
Prices and Wages															
Consumer Price Index	2.195	1.44	−0.49	−0.42	−0.35	−0.27	−0.18	−0.09	−0.04	0.01	0.05	0.08	0.08	4.60	1.94
			(−4.27)	(−3.54)	(−2.83)	(−2.14)	(−1.43)	(−0.70)	(−0.27)	(0.10)	(0.39)	(0.58)	(0.64)		
Producer Price Index	2.709	3.48	−0.85	−0.79	−0.67	−0.53	−0.42	−0.35	−0.31	−0.28	−0.26	−0.23	−0.23	1.60	1.27
			(−9.66)	(−8.00)	(−5.64)	(−3.94)	(−2.92)	(−2.42)	(−2.05)	(−1.84)	(−1.65)	(−1.46)	(−1.43)		
GDP Price Deflactor	2.133	1.40	−0.56	−0.46	−0.36	−0.25	−0.15	−0.05	0.03	0.11	0.17	0.21	0.21	2.34	1.79
			(−5.15)	(−3.97)	(−2.92)	(−2.02)	(−1.20)	(−0.43)	(0.26)	(0.87)	(1.34)	(1.60)	(1.65)		
Inflation Rate (CPI)	0.467	0.31	−0.09	0.01	0.10	0.16	0.20	0.21	0.21	0.18	0.14	0.07	0.00	2.74	2.00
			(−0.69)	(0.10)	(0.78)	(1.28)	(1.60)	(1.71)	(1.64)	(1.43)	(1.05)	(0.53)	(−0.02)		
Inflation Rate (PPI)	0.832	1.07	−0.18	0.06	0.27	0.36	0.31	0.13	0.01	−0.03	−0.02	−0.02	−0.11	1.71	1.39
			(−1.11)	(0.37)	(1.74)	(2.44)	(2.06)	(0.85)	(0.08)	(−0.22)	(−0.13)	(−0.14)	(−0.67)		
Inflation Rate (DGDP)	18.528	12.13	0.24	0.36	0.41	0.42	0.39	0.34	0.32	0.26	0.17	0.08	0.00	0.78	1.09
			(1.83)	(2.95)	(3.46)	(3.54)	(3.28)	(2.85)	(2.60)	(2.08)	(1.36)	(0.61)	(−0.02)		

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are H_0 : x_t show no Granger causality to y_t y H_0 : y_t show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Unitary Labour Cost Index	3.076	2.01	−0.39 (−3.21)	−0.35 (−2.86)	−0.32 (−2.59)	−0.29 (−2.34)	−0.24 (−1.97)	−0.17 (−1.37)	−0.11 (−0.89)	−0.03 (−0.27)	0.05 (0.41)	0.14 (1.10)	0.23 (1.76)	4.64	4.56
Average Earnings per Hour	0.891	2.27	−0.85 (−5.70)	−0.72 (−3.86)	−0.49 (−2.17)	−0.23 (−0.95)	−0.03 (−0.13)	0.09 (0.37)	0.25 (1.08)	0.40 (1.74)	0.50 (2.22)	0.53 (2.33)	0.54 (2.29)	24.05	40.08
Real Average Earnings per Hour	0.690	1.76	−0.90 (−7.58)	−0.81 (−5.23)	−0.56 (−2.59)	−0.27 (−1.14)	−0.08 (−0.34)	0.03 (0.14)	0.15 (0.64)	0.22 (0.91)	0.27 (1.09)	0.30 (1.17)	0.33 (1.24)	217.03	62.04
ULCI Growth Rate	0.589	0.39	−0.03 (−0.23)	−0.02 (−0.18)	−0.03 (−0.20)	0.00 (0.00)	0.08 (0.62)	0.20 (1.61)	0.31 (2.57)	0.41 (3.44)	0.45 (3.91)	0.45 (3.84)	0.41 (3.42)	3.62	2.37
AEH Growth Rate	0.410	1.05	−0.05 (−0.16)	0.18 (0.67)	0.45 (1.96)	0.52 (2.42)	0.40 (1.81)	0.26 (1.13)	0.20 (0.85)	0.13 (0.51)	0.00 (0.01)	−0.22 (−0.84)	−0.46 (−1.87)	7.66	22.38
RAEH Growth Rate	0.441	1.13	−0.16 (−0.57)	0.09 (0.33)	0.38 (1.61)	0.45 (2.01)	0.33 (1.43)	0.19 (0.82)	0.05 (0.22)	−0.01 (−0.03)	−0.03 (−0.13)	−0.11 (−0.42)	−0.24 (−0.88)	31.31	17.59
Money															
M2	3.672	2.41	0.24 (1.86)	0.45 (3.86)	0.61 (5.89)	0.70 (7.69)	0.75 (8.79)	0.75 (8.94)	0.72 (8.08)	0.66 (6.74)	0.57 (5.29)	0.45 (3.84)	0.31 (2.42)	7.60	0.75
Monetary Base	7.048	4.62	0.13 (0.99)	0.02 (0.19)	−0.05 (−0.38)	−0.10 (−0.76)	−0.12 (−0.92)	−0.11 (−0.84)	−0.07 (−0.57)	−0.03 (−0.25)	0.00 (0.03)	0.02 (0.18)	0.03 (0.21)	0.40	1.28
Real M2	3.537	2.32	0.60 (5.61)	0.75 (8.73)	0.85 (12.38)	0.89 (14.85)	0.87 (13.78)	0.81 (10.96)	0.72 (8.16)	0.60 (5.81)	0.45 (3.92)	0.29 (2.33)	0.12 (0.95)	3.33	1.23
Real Monetary Base	7.310	4.79	0.32 (2.53)	0.17 (1.33)	0.06 (0.47)	−0.02 (−0.14)	−0.07 (−0.53)	−0.09 (−0.68)	−0.08 (−0.62)	−0.06 (−0.49)	−0.05 (−0.35)	−0.04 (−0.27)	−0.03 (−0.26)	0.93	1.51
M2 Growth Rate	0.916	0.62	0.81 (10.43)	0.69 (7.29)	0.51 (4.48)	0.29 (2.31)	0.08 (0.60)	−0.09 (−0.68)	−0.31 (−2.54)	−0.49 (−4.32)	−0.59 (−5.56)	−0.62 (−5.93)	−0.59 (−5.45)	6.71	1.44
Monetary Base Growth Rate	2.615	1.77	−0.24 (−1.87)	−0.25 (−1.95)	−0.22 (−1.68)	−0.16 (−1.22)	−0.08 (−0.65)	0.00 (−0.01)	0.05 (0.39)	0.08 (0.63)	0.08 (0.59)	0.05 (0.35)	0.00 (0.03)	0.20	0.69

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 29: Descriptive Statistics for First Differences of Series. 1986-1997.

Serie	s.d(%)	σ_x/σ_y	Cross Correlations between GDP(t) and x(t+l) l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	0.503	1	0.38 (2.60)	0.52 (3.92)	0.65 (5.54)	0.76 (7.78)	0.91 (14.57)	1.00 (−)	0.91 (14.57)	0.76 (7.78)	0.65 (5.54)	0.52 (3.92)	0.38 (2.60)	-	-
Aggregate Consumption	0.630	1.25	0.20 (1.31)	0.28 (1.87)	0.44 (3.24)	0.63 (5.37)	0.78 (8.47)	0.84 (10.36)	0.77 (8.00)	0.66 (5.90)	0.61 (5.08)	0.59 (4.77)	0.55 (4.23)	2.71	3.08
Durables Consumption	2.150	4.27	0.23 (1.48)	0.31 (2.08)	0.44 (3.23)	0.59 (4.82)	0.69 (6.44)	0.71 (6.76)	0.61 (5.19)	0.45 (3.31)	0.27 (1.81)	0.13 (0.86)	0.07 (0.43)	1.69	0.66
Non Durables Consumption	0.536	1.06	0.15 (0.99)	0.21 (1.42)	0.35 (2.47)	0.51 (3.96)	0.67 (5.98)	0.74 (7.40)	0.69 (6.48)	0.63 (5.45)	0.66 (5.80)	0.72 (6.67)	0.69 (6.18)	1.13	4.88
Government Expenditure	0.913	1.81	0.07 (0.43)	0.12 (0.80)	0.17 (1.12)	0.21 (1.40)	0.30 (2.14)	0.40 (2.99)	0.42 (3.10)	0.46 (3.47)	0.53 (4.08)	0.56 (4.36)	0.57 (4.47)	0.80	1.49
Gross Fixed Investment	2.079	4.11	0.38 (2.61)	0.53 (4.01)	0.67 (5.88)	0.78 (8.18)	0.87 (11.77)	0.91 (14.67)	0.83 (9.89)	0.73 (7.08)	0.62 (5.20)	0.48 (3.57)	0.34 (2.33)	1.01	0.80
Change in Inventories	0.297	0.59	0.07 (0.47)	0.06 (0.41)	0.09 (0.58)	0.19 (1.29)	0.35 (2.51)	0.48 (3.74)	0.56 (4.52)	0.52 (4.09)	0.37 (2.59)	0.14 (0.93)	−0.06 (−0.39)	1.65	3.25
Investment	2.400	4.77	0.36 (2.48)	0.49 (3.60)	0.61 (5.03)	0.72 (6.87)	0.83 (9.99)	0.89 (13.32)	0.84 (10.30)	0.75 (7.62)	0.63 (5.31)	0.45 (3.31)	0.28 (1.89)	0.95	0.64
Exports	1.388	2.75	−0.20 (−1.29)	−0.19 (−1.28)	−0.16 (−1.03)	−0.09 (−0.59)	−0.06 (−0.39)	−0.10 (−0.70)	−0.28 (−1.96)	−0.47 (−3.56)	−0.58 (−4.64)	−0.64 (−5.39)	−0.64 (−5.39)	1.00	2.76
Imports	2.110	4.19	0.20 (1.34)	0.29 (1.95)	0.45 (3.32)	0.63 (5.39)	0.73 (7.19)	0.72 (7.01)	0.58 (4.84)	0.44 (3.27)	0.34 (2.34)	0.24 (1.57)	0.16 (1.02)	3.07	4.65
Net Exports	0.517	1.02	−0.15 (−0.96)	−0.22 (−1.45)	−0.38 (−2.64)	−0.55 (−4.30)	−0.67 (−6.05)	−0.72 (−6.97)	−0.74 (−7.23)	−0.74 (−7.18)	−0.69 (−6.10)	−0.62 (−5.04)	−0.54 (−4.02)	3.00	2.21
Sectoral Employment and Output															
Agriculture GVA	2.714	5.43	0.27 (1.81)	0.19 (1.30)	0.13 (0.89)	0.11 (0.73)	0.08 (0.53)	0.05 (0.36)	0.06 (0.38)	0.10 (0.67)	0.17 (1.12)	0.24 (1.59)	0.30 (2.05)	0.64	1.20
Industry GVA	0.817	1.63	0.15 (1.00)	0.30 (2.04)	0.47 (3.53)	0.61 (5.20)	0.70 (6.58)	0.71 (6.94)	0.62 (5.41)	0.44 (3.30)	0.26 (1.81)	0.12 (0.77)	−0.03 (−0.16)	1.57	1.61
Construction GVA	1.630	3.26	0.36 (2.50)	0.49 (3.64)	0.58 (4.68)	0.66 (5.93)	0.72 (7.03)	0.78 (8.56)	0.78 (8.42)	0.73 (7.14)	0.65 (5.68)	0.58 (4.67)	0.49 (3.68)	1.78	0.92
Non Sale Services GVA	0.646	1.29	0.09 (0.61)	0.16 (1.03)	0.23 (1.55)	0.33 (2.31)	0.44 (3.37)	0.56 (4.66)	0.63 (5.44)	0.70 (6.63)	0.75 (7.56)	0.76 (7.76)	0.71 (6.54)	0.36	3.00
Sale Services GVA	0.321	0.64	0.45 (3.23)	0.55 (4.35)	0.68 (6.16)	0.80 (8.81)	0.87 (11.73)	0.85 (11.14)	0.75 (7.63)	0.59 (4.96)	0.42 (3.03)	0.24 (1.60)	0.14 (0.94)	2.36	1.50
Agricultural Employment	1.511	2.99	0.34 (2.37)	0.30 (2.05)	0.20 (1.35)	0.21 (1.47)	0.18 (1.26)	0.13 (0.87)	0.09 (0.64)	0.06 (0.39)	−0.05 (−0.30)	−0.05 (−0.31)	−0.09 (−0.62)	1.21	0.81
Industrial Employment	1.309	2.59	0.23 (1.56)	0.33 (2.27)	0.44 (3.26)	0.61 (5.20)	0.71 (6.86)	0.75 (7.74)	0.76 (7.98)	0.65 (5.72)	0.54 (4.28)	0.37 (2.58)	0.29 (1.94)	1.57	4.94
Construction Employment	2.206	4.36	0.37 (2.62)	0.49 (3.68)	0.55 (4.38)	0.61 (5.14)	0.62 (5.38)	0.64 (5.76)	0.69 (6.39)	0.69 (6.31)	0.62 (5.29)	0.53 (4.10)	0.45 (3.28)	1.21	5.39
Services Employment	0.679	1.34	0.36 (2.49)	0.44 (3.24)	0.54 (4.26)	0.58 (4.78)	0.67 (6.18)	0.74 (7.45)	0.73 (7.20)	0.65 (5.81)	0.60 (5.03)	0.58 (4.68)	0.51 (3.80)	0.96	2.33
Agriculture, Livestock and Fishing Emp.	1.780	3.26	0.41 (2.01)	0.41 (2.03)	0.18 (0.87)	0.27 (1.34)	0.35 (1.82)	0.14 (0.73)	0.21 (1.06)	0.26 (1.28)	0.14 (0.66)	0.06 (0.26)	0.04 (0.18)	0.76	1.16
Energy and Water Employment	3.223	5.89	0.09 (0.38)	0.18 (0.83)	0.23 (1.11)	0.13 (0.65)	0.14 (0.71)	0.29 (1.52)	0.25 (1.26)	0.22 (1.10)	0.38 (1.95)	0.52 (2.80)	0.41 (2.00)	1.65	2.79
Mining and Chemical Employment	2.221	4.06	0.17 (0.77)	0.21 (0.97)	0.29 (1.42)	0.13 (0.65)	0.21 (1.05)	0.40 (2.21)	0.42 (2.24)	0.44 (2.37)	0.53 (2.97)	0.51 (2.74)	0.47 (2.37)	1.48	5.98
Metal and Precision Employment	2.272	4.16	0.29 (1.33)	0.20 (0.93)	0.15 (0.72)	0.19 (0.91)	0.27 (1.39)	0.51 (2.98)	0.55 (3.20)	0.39 (2.00)	0.29 (1.44)	0.18 (0.86)	0.32 (1.52)	4.29	2.37
Other Manufacturing Employment	1.139	2.08	0.42 (2.08)	0.51 (2.72)	0.60 (3.55)	0.65 (4.11)	0.76 (5.80)	0.83 (7.34)	0.75 (5.59)	0.63 (3.85)	0.59 (3.42)	0.45 (2.32)	0.44 (2.21)	0.28	4.06
Construction Employment	2.002	3.66	0.56 (3.05)	0.67 (4.12)	0.74 (5.13)	0.82 (6.94)	0.79 (6.37)	0.75 (5.61)	0.71 (4.94)	0.72 (4.93)	0.74 (5.12)	0.77 (5.58)	0.88 (8.26)	5.10	12.28
Commerce and Hotel Employment	1.404	2.57	0.36 (1.72)	0.45 (2.31)	0.44 (2.28)	0.49 (2.67)	0.57 (3.40)	0.65 (4.29)	0.64 (4.06)	0.46 (2.46)	0.49 (2.60)	0.45 (2.34)	0.54 (2.86)	0.92	2.97
Communication and Transport Employment	1.805	3.30	−0.06 (−0.28)	−0.05 (−0.21)	0.07 (0.34)	0.06 (0.28)	0.21 (1.05)	0.43 (2.36)	0.40 (2.14)	0.27 (1.32)	0.18 (0.87)	0.29 (1.40)	0.41 (1.99)	1.01	4.52

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Finance and Insurance Employment	2.290	4.19	0.17 (0.76)	0.26 (1.26)	0.27 (1.29)	0.21 (1.06)	0.22 (1.08)	0.30 (1.58)	0.29 (1.48)	0.33 (1.65)	0.27 (1.34)	0.29 (1.41)	0.21 (0.98)	2.26	2.15
Others Services Employment	0.977	1.79	0.01 (0.03)	0.12 (0.56)	0.29 (1.42)	0.16 (0.80)	0.14 (0.68)	0.30 (1.60)	0.31 (1.59)	0.33 (1.65)	0.26 (1.24)	0.20 (0.93)	0.10 (0.44)	1.16	1.66
General Industrial Production Index	3.594	7.11	0.17 (1.12)	0.22 (1.48)	0.36 (2.55)	0.40 (2.96)	0.42 (3.17)	0.46 (3.52)	0.35 (2.55)	0.22 (1.49)	0.07 (0.45)	−0.01 (−0.04)	−0.13 (−0.82)	0.98	4.51
Energy and Water IPI	2.444	4.83	−0.03 (−0.19)	0.07 (0.47)	0.14 (0.91)	0.10 (0.70)	0.15 (1.01)	0.14 (0.99)	0.18 (1.22)	0.13 (0.86)	0.04 (0.29)	0.04 (0.26)	0.14 (0.91)	1.04	3.54
Mining and Chemical IPI	2.405	4.76	0.02 (0.13)	0.09 (0.62)	0.27 (1.88)	0.26 (1.84)	0.29 (2.03)	0.24 (1.68)	0.16 (1.08)	−0.01 (−0.07)	−0.13 (−0.87)	−0.14 (−0.96)	−0.23 (−1.52)	3.46	2.60
Metal and Precision IPI	3.594	7.11	0.17 (1.12)	0.22 (1.48)	0.36 (2.55)	0.40 (2.96)	0.42 (3.17)	0.46 (3.52)	0.35 (2.55)	0.22 (1.49)	0.07 (0.45)	−0.01 (−0.04)	−0.13 (−0.82)	0.98	4.51
Other Manufacturing IPI	2.108	4.17	0.15 (0.96)	0.21 (1.43)	0.34 (2.38)	0.40 (2.90)	0.35 (2.54)	0.25 (1.75)	0.19 (1.30)	0.08 (0.57)	−0.11 (−0.74)	−0.16 (−1.09)	−0.20 (−1.31)	2.93	3.02
Aggregate Employment and Productivity															
Labour Force	0.266	0.53	0.43 (3.10)	0.42 (3.03)	0.44 (3.25)	0.37 (2.66)	0.32 (2.35)	0.28 (2.05)	0.22 (1.52)	0.11 (0.72)	0.11 (0.78)	0.14 (0.92)	0.12 (0.81)	1.84	2.78
Employment	0.667	1.33	0.43 (3.11)	0.51 (3.94)	0.62 (5.30)	0.71 (6.92)	0.79 (8.72)	0.82 (10.11)	0.82 (9.83)	0.77 (8.23)	0.67 (6.01)	0.57 (4.59)	0.46 (3.36)	1.51	1.63
Government Employment	1.507	3.01	−0.06 (−0.38)	0.00 (−0.02)	0.03 (0.19)	0.01 (0.07)	0.04 (0.26)	0.10 (0.73)	0.10 (0.70)	0.19 (1.30)	0.26 (1.81)	0.37 (2.65)	0.43 (3.09)	0.32	1.61
Activity Rate	0.271	0.54	0.35 (2.42)	0.32 (2.27)	0.33 (2.38)	0.24 (1.71)	0.20 (1.42)	0.16 (1.10)	0.11 (0.77)	−0.03 (−0.17)	−0.01 (−0.07)	0.02 (0.16)	0.02 (0.13)	1.14	2.78
Unemployment Rate	2.475	4.94	−0.31 (−2.14)	−0.42 (−3.06)	−0.53 (−4.22)	−0.66 (−5.88)	−0.74 (−7.58)	−0.79 (−8.84)	−0.79 (−8.93)	−0.75 (−7.73)	−0.65 (−5.69)	−0.55 (−4.33)	−0.44 (−3.18)	1.12	1.83
Average Hours Wage-earners	0.850	1.70	0.02 (0.13)	0.03 (0.18)	0.00 (−0.03)	−0.08 (−0.54)	−0.06 (−0.40)	−0.01 (−0.05)	−0.04 (−0.29)	−0.06 (−0.40)	0.03 (0.20)	−0.05 (−0.31)	−0.20 (−1.32)	0.13	2.28
Average Hours Employees	0.453	0.90	−0.02 (−0.15)	−0.03 (−0.21)	−0.07 (−0.49)	−0.13 (−0.86)	−0.05 (−0.35)	−0.01 (−0.08)	0.02 (0.11)	−0.09 (−0.64)	−0.08 (−0.54)	−0.06 (−0.42)	−0.08 (−0.52)	0.57	0.72
Total Hours Wage-earners	1.260	2.52	0.37 (2.60)	0.43 (3.12)	0.47 (3.56)	0.46 (3.52)	0.49 (3.88)	0.55 (4.59)	0.53 (4.28)	0.62 (5.40)	0.60 (5.09)	0.49 (3.68)	0.32 (2.21)	0.93	6.40
Total Hours Employees	0.754	1.51	0.38 (2.67)	0.44 (3.22)	0.51 (4.00)	0.58 (4.82)	0.67 (6.21)	0.71 (6.97)	0.73 (7.26)	0.63 (5.51)	0.55 (4.38)	0.46 (3.42)	0.35 (2.41)	0.66	1.97
Labour Productivity Wage-earners	1.644	3.28	−0.07 (−0.49)	−0.12 (−0.83)	−0.18 (−1.25)	−0.10 (−0.67)	−0.12 (−0.80)	−0.06 (−0.40)	−0.10 (−0.72)	−0.15 (−1.01)	−0.20 (−1.34)	−0.15 (−1.03)	−0.15 (−0.99)	1.08	1.15
Labour Productivity Employees	3.109	6.21	0.02 (0.10)	−0.03 (−0.20)	0.03 (0.20)	0.00 (0.00)	−0.04 (−0.25)	−0.01 (−0.09)	−0.02 (−0.14)	0.04 (0.26)	−0.04 (−0.27)	−0.05 (−0.31)	−0.03 (−0.18)	0.89	0.76
Capacity Utilization	1.766	3.49	0.15 (0.99)	0.25 (1.67)	0.29 (2.00)	0.30 (2.13)	0.28 (1.99)	0.29 (2.07)	0.13 (0.87)	0.10 (0.67)	−0.02 (−0.14)	−0.13 (−0.88)	−0.23 (−1.56)	0.73	2.27
Total Factor Productivity (epa)	0.384	0.76	0.12 (0.75)	0.16 (1.04)	0.27 (1.83)	0.30 (2.14)	0.34 (2.43)	0.35 (2.59)	0.37 (2.68)	0.21 (1.45)	0.09 (0.63)	0.02 (0.12)	−0.08 (−0.50)	0.61	0.32
Total Factor Productivity (es)	0.691	1.37	−0.06 (−0.40)	−0.10 (−0.63)	−0.06 (−0.42)	−0.04 (−0.26)	0.04 (0.26)	0.08 (0.55)	0.05 (0.36)	−0.03 (−0.20)	−0.12 (−0.79)	−0.25 (−1.67)	−0.27 (−1.84)	0.80	1.49
Vacancies	13.624	26.79	0.25 (1.65)	0.28 (1.85)	0.13 (0.85)	0.06 (0.42)	0.17 (1.16)	0.23 (1.60)	0.14 (0.96)	0.15 (1.03)	0.22 (1.43)	0.22 (1.46)	0.16 (1.00)	3.34	0.57
Prices and Wages															
Consumer Price Index	0.607	1.27	0.10 (0.68)	0.12 (0.81)	0.06 (0.43)	0.05 (0.35)	0.07 (0.47)	0.06 (0.41)	0.08 (0.54)	0.07 (0.50)	0.07 (0.52)	0.18 (1.28)	0.31 (2.23)	0.38	2.37
Producer Price Index	0.610	1.28	0.01 (0.08)	−0.05 (−0.36)	−0.10 (−0.67)	−0.04 (−0.30)	0.01 (0.07)	0.05 (0.37)	0.05 (0.36)	−0.01 (−0.04)	−0.03 (−0.20)	−0.09 (−0.62)	−0.19 (−1.33)	0.42	0.94
GDP Price Deflactor	0.653	1.37	0.15 (1.03)	0.10 (0.72)	0.06 (0.40)	0.07 (0.52)	0.09 (0.67)	0.07 (0.48)	0.09 (0.65)	0.19 (1.38)	0.26 (1.88)	0.32 (2.30)	0.41 (3.10)	0.39	1.05
Inflation Rate (CPI)	0.597	1.25	0.02 (0.12)	0.02 (0.15)	−0.04 (−0.30)	−0.02 (−0.12)	0.02 (0.11)	−0.01 (−0.05)	0.03 (0.20)	−0.01 (−0.10)	−0.01 (−0.04)	0.09 (0.65)	0.08 (0.58)	0.24	1.58
Inflation Rate (PPI)	0.456	0.95	−0.08 (−0.56)	−0.08 (−0.53)	−0.03 (−0.23)	0.05 (0.37)	0.06 (0.42)	0.06 (0.42)	0.01 (0.09)	−0.09 (−0.65)	−0.05 (−0.32)	−0.10 (−0.72)	−0.16 (−1.10)	0.41	0.87
Inflation Rate (DGDP)	26.113	54.61	−0.02 (−0.15)	−0.05 (−0.32)	−0.08 (−0.56)	0.07 (0.48)	0.07 (0.48)	0.04 (0.27)	0.07 (0.49)	0.17 (1.23)	0.13 (0.89)	0.05 (0.33)	0.04 (0.27)	0.45	1.05

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Unitary Labour Cost Index	0.944	1.98	−0.18 (−1.23)	−0.20 (−1.42)	−0.23 (−1.68)	−0.22 (−1.61)	−0.17 (−1.25)	−0.09 (−0.62)	0.06 (0.40)	0.20 (1.41)	0.36 (2.70)	0.47 (3.71)	0.59 (5.04)	0.63	2.04
Average Earnings per Hour	1.345	2.81	0.04 (0.28)	0.01 (0.10)	−0.03 (−0.18)	0.04 (0.29)	0.01 (0.09)	−0.02 (−0.17)	−0.03 (−0.21)	0.10 (0.71)	0.06 (0.41)	0.12 (0.84)	0.21 (1.48)	0.64	3.41
Real Average Earnings per Hour	1.166	2.44	0.00 (0.00)	−0.04 (−0.27)	−0.06 (−0.42)	0.02 (0.16)	−0.02 (−0.14)	−0.06 (−0.41)	−0.07 (−0.52)	0.08 (0.57)	0.03 (0.22)	0.05 (0.37)	0.06 (0.40)	0.67	1.57
ULCI Growth Rate	0.644	1.35	−0.05 (−0.32)	−0.04 (−0.28)	−0.06 (−0.39)	0.02 (0.14)	0.07 (0.53)	0.13 (0.92)	0.20 (1.47)	0.21 (1.50)	0.24 (1.76)	0.17 (1.20)	0.18 (1.26)	0.62	1.55
AEH Growth Rate	2.272	4.75	−0.02 (−0.11)	−0.01 (−0.09)	−0.01 (−0.10)	0.03 (0.23)	−0.02 (−0.14)	−0.02 (−0.15)	0.00 (0.01)	0.07 (0.52)	−0.03 (−0.20)	0.03 (0.22)	0.02 (0.12)	0.52	2.36
RAEH Growth Rate	2.060	4.31	−0.02 (−0.16)	−0.02 (−0.14)	0.00 (−0.02)	0.04 (0.29)	−0.03 (−0.19)	−0.02 (−0.15)	−0.01 (−0.05)	0.09 (0.61)	−0.03 (−0.21)	0.01 (0.07)	0.00 (−0.02)	0.67	1.34
Money															
M2	1.474	2.98	0.14 (0.96)	0.28 (1.95)	0.41 (3.00)	0.53 (4.20)	0.61 (5.30)	0.61 (5.37)	0.60 (5.13)	0.56 (4.60)	0.51 (4.01)	0.48 (3.63)	0.45 (3.29)	1.36	1.49
Monetary Base	5.485	11.08	−0.06 (−0.41)	0.07 (0.47)	0.12 (0.82)	0.09 (0.63)	0.11 (0.73)	0.09 (0.65)	0.09 (0.60)	0.04 (0.30)	−0.01 (−0.10)	−0.05 (−0.31)	−0.02 (−0.15)	0.98	0.30
Real M2	1.386	2.80	0.15 (1.00)	0.29 (2.00)	0.43 (3.18)	0.53 (4.29)	0.60 (5.21)	0.61 (5.30)	0.58 (4.85)	0.50 (3.89)	0.42 (3.10)	0.36 (2.53)	0.31 (2.17)	1.52	1.74
Real Monetary Base	5.554	11.22	−0.06 (−0.41)	0.07 (0.44)	0.12 (0.79)	0.08 (0.57)	0.09 (0.64)	0.08 (0.56)	0.07 (0.50)	0.02 (0.15)	−0.04 (−0.29)	−0.08 (−0.55)	−0.06 (−0.40)	0.97	0.35
M2 Growth Rate	1.160	2.34	0.21 (1.43)	0.15 (0.97)	0.14 (0.98)	0.14 (0.95)	0.10 (0.72)	0.00 (0.03)	−0.03 (−0.18)	−0.05 (−0.37)	−0.06 (−0.44)	−0.05 (−0.33)	−0.04 (−0.29)	1.85	0.28
Monetary Base Growth Rate	6.130	12.39	0.00 (−0.01)	0.11 (0.72)	0.04 (0.28)	−0.03 (−0.20)	0.01 (0.07)	−0.01 (−0.07)	0.00 (−0.03)	−0.04 (−0.27)	−0.05 (−0.37)	−0.03 (−0.21)	0.02 (0.13)	1.15	0.41

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 30: Descriptive Statistics for Hodrick-Prescott Cyclical Component of Series. 1986-1997.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.241	1	0.42 (2.96)	0.58 (4.65)	0.74 (7.24)	0.87 (11.86)	0.97 (24.81)	1.00 (−)	0.97 (24.81)	0.87 (11.86)	0.74 (7.24)	0.58 (4.65)	0.42 (2.96)	-	-
Aggregate Consumption	1.332	1.07	0.20 (1.32)	0.36 (2.48)	0.54 (4.18)	0.71 (6.62)	0.83 (10.06)	0.90 (13.62)	0.89 (13.32)	0.84 (10.46)	0.77 (7.91)	0.68 (6.01)	0.59 (4.68)	1.97	4.48
Durables Consumption	4.160	3.35	0.34 (2.33)	0.42 (3.02)	0.53 (4.08)	0.63 (5.31)	0.68 (6.26)	0.68 (6.29)	0.60 (5.09)	0.48 (3.64)	0.34 (2.39)	0.23 (1.50)	0.15 (0.98)	2.03	0.39
Non Durables Consumption	1.114	0.89	0.05 (0.32)	0.22 (1.47)	0.41 (2.94)	0.59 (4.86)	0.74 (7.45)	0.84 (10.71)	0.89 (13.14)	0.90 (13.60)	0.88 (12.32)	0.84 (10.03)	0.77 (7.71)	2.14	7.90
Government Expenditure	1.194	0.96	−0.28 (−1.89)	−0.18 (−1.22)	−0.06 (−0.43)	0.06 (0.43)	0.20 (1.40)	0.34 (2.44)	0.42 (3.08)	0.49 (3.70)	0.55 (4.29)	0.59 (4.72)	0.63 (5.17)	2.09	2.37
Gross Fixed Investment	5.054	4.07	0.48 (3.50)	0.63 (5.29)	0.78 (8.09)	0.89 (12.81)	0.95 (21.04)	0.96 (23.11)	0.90 (14.06)	0.79 (8.57)	0.64 (5.52)	0.47 (3.47)	0.29 (1.95)	0.90	0.70
Change in Inventories	0.206	0.16	0.14 (0.88)	0.21 (1.40)	0.32 (2.21)	0.44 (3.27)	0.56 (4.50)	0.63 (5.56)	0.63 (5.51)	0.55 (4.42)	0.40 (2.88)	0.20 (1.32)	−0.02 (−0.10)	1.74	3.85
Investment	5.694	4.58	0.43 (3.09)	0.58 (4.64)	0.73 (6.94)	0.85 (10.52)	0.93 (16.34)	0.95 (20.12)	0.90 (14.09)	0.79 (8.66)	0.64 (5.46)	0.45 (3.31)	0.26 (1.71)	0.85	1.47
Exports	1.924	1.55	0.17 (1.09)	0.18 (1.19)	0.18 (1.20)	0.15 (1.04)	0.08 (0.55)	−0.04 (−0.30)	−0.22 (−1.52)	−0.43 (−3.12)	−0.60 (−4.92)	−0.71 (−6.49)	−0.73 (−6.94)	0.72	3.23
Imports	4.090	3.29	0.37 (2.56)	0.51 (3.87)	0.67 (5.87)	0.79 (8.69)	0.86 (11.42)	0.85 (10.86)	0.76 (7.79)	0.61 (5.05)	0.44 (3.17)	0.28 (1.86)	0.14 (0.91)	1.79	4.49
Net Exports	0.943	0.76	−0.12 (−0.74)	−0.26 (−1.77)	−0.45 (−3.26)	−0.62 (−5.25)	−0.76 (−7.87)	−0.84 (−10.68)	−0.87 (−11.58)	−0.83 (−9.87)	−0.75 (−7.53)	−0.65 (−5.54)	−0.53 (−3.97)	1.79	8.93
Sectoral Employment and Output															
Agriculture GVA	5.571	4.53	0.10 (0.66)	0.11 (0.73)	0.11 (0.76)	0.12 (0.82)	0.14 (0.96)	0.17 (1.21)	0.20 (1.42)	0.24 (1.69)	0.29 (2.06)	0.35 (2.48)	0.40 (2.89)	0.45	1.79
Industry GVA	1.679	1.37	0.39 (2.77)	0.54 (4.23)	0.69 (6.36)	0.81 (9.21)	0.86 (11.69)	0.85 (11.11)	0.77 (8.24)	0.62 (5.42)	0.44 (3.33)	0.25 (1.75)	0.08 (0.54)	1.68	3.79
Construction GVA	4.136	3.36	0.33 (2.32)	0.49 (3.76)	0.63 (5.49)	0.74 (7.46)	0.81 (9.56)	0.85 (11.00)	0.83 (10.30)	0.78 (8.42)	0.69 (6.34)	0.57 (4.54)	0.43 (3.09)	1.72	1.24
Non Sale Services GVA	1.155	0.94	−0.18 (−1.20)	−0.02 (−0.16)	0.15 (1.02)	0.33 (2.35)	0.50 (3.95)	0.65 (5.89)	0.77 (8.17)	0.85 (11.04)	0.89 (13.34)	0.88 (12.51)	0.83 (9.71)	0.96	4.25
Sale Services GVA	0.813	0.66	0.56 (4.42)	0.70 (6.57)	0.83 (10.10)	0.92 (16.21)	0.96 (22.54)	0.93 (17.34)	0.84 (10.46)	0.69 (6.53)	0.52 (4.09)	0.34 (2.42)	0.18 (1.22)	2.82	1.18
Agricultural Employment	2.068	1.68	0.67 (5.98)	0.66 (5.76)	0.61 (5.15)	0.56 (4.57)	0.50 (3.93)	0.43 (3.33)	0.35 (2.53)	0.23 (1.61)	0.09 (0.63)	−0.04 (−0.24)	−0.16 (−1.09)	1.67	0.61
Industrial Employment	2.759	2.24	0.21 (1.41)	0.36 (2.54)	0.52 (4.13)	0.69 (6.43)	0.81 (9.56)	0.89 (13.58)	0.91 (15.43)	0.88 (12.75)	0.80 (9.06)	0.69 (6.38)	0.57 (4.59)	1.70	7.29
Construction Employment	5.152	4.19	0.34 (2.35)	0.52 (3.99)	0.67 (6.11)	0.79 (8.84)	0.87 (12.18)	0.91 (15.52)	0.92 (16.29)	0.89 (12.99)	0.81 (9.11)	0.69 (6.36)	0.55 (4.31)	1.35	6.43
Services Employment	1.570	1.28	0.38 (2.73)	0.52 (4.09)	0.65 (5.80)	0.76 (7.88)	0.84 (10.49)	0.88 (12.87)	0.88 (12.74)	0.84 (10.67)	0.77 (8.15)	0.67 (6.04)	0.54 (4.20)	0.75	2.68
Agriculture, Livestock and Fishing Emp.	2.479	2.11	0.80 (6.19)	0.79 (6.10)	0.69 (4.57)	0.63 (4.02)	0.59 (3.62)	0.49 (2.88)	0.40 (2.18)	0.26 (1.31)	0.04 (0.21)	−0.19 (−0.89)	−0.43 (−2.21)	2.65	3.40
Energy and Water Employment	4.499	3.83	0.30 (1.47)	0.39 (1.98)	0.44 (2.36)	0.44 (2.38)	0.43 (2.35)	0.43 (2.43)	0.43 (2.40)	0.49 (2.73)	0.47 (2.55)	0.46 (2.40)	0.37 (1.80)	1.27	2.35
Mining and Chemical Employment	3.332	2.83	0.30 (1.42)	0.40 (2.05)	0.50 (2.74)	0.52 (3.02)	0.58 (3.60)	0.65 (4.36)	0.63 (4.05)	0.64 (4.10)	0.72 (5.01)	0.73 (4.98)	0.68 (4.29)	1.82	6.83
Metal and Precision Employment	2.838	2.41	0.74 (5.10)	0.71 (4.67)	0.68 (4.46)	0.69 (4.63)	0.72 (5.22)	0.78 (6.39)	0.70 (4.92)	0.54 (3.17)	0.38 (1.97)	0.22 (1.04)	0.01 (0.04)	1.31	3.10
Other Manufacturing Employment	1.845	1.57	0.49 (2.60)	0.62 (3.70)	0.74 (5.23)	0.81 (6.67)	0.85 (8.12)	0.81 (7.17)	0.65 (4.28)	0.43 (2.32)	0.18 (0.90)	−0.02 (−0.11)	−0.16 (−0.74)	0.59	3.61
Construction Employment	4.384	3.73	0.53 (2.87)	0.69 (4.41)	0.84 (7.32)	0.92 (11.88)	0.96 (16.64)	0.94 (13.59)	0.86 (8.46)	0.77 (5.86)	0.69 (4.56)	0.62 (3.66)	0.56 (3.10)	12.01	3.32
Commerce and Hotel Employment	1.729	1.47	0.48 (2.52)	0.60 (3.51)	0.68 (4.44)	0.76 (5.68)	0.80 (6.64)	0.78 (6.39)	0.64 (4.15)	0.45 (2.47)	0.27 (1.33)	0.04 (0.20)	−0.21 (−1.00)	0.63	4.10

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.575	2.19	0.28 (1.33)	0.30 (1.50)	0.37 (1.91)	0.41 (2.21)	0.50 (2.86)	0.57 (3.55)	0.60 (3.75)	0.56 (3.33)	0.56 (3.28)	0.56 (3.17)	0.54 (2.97)	0.82	6.85
Finance and Insurance Employment	2.084	1.77	0.25 (1.17)	0.37 (1.87)	0.48 (2.65)	0.52 (2.99)	0.52 (3.05)	0.53 (3.19)	0.42 (2.32)	0.35 (1.81)	0.27 (1.34)	0.19 (0.89)	0.04 (0.17)	1.33	0.92
Others Services Employment	1.096	0.93	0.05 (0.22)	0.18 (0.87)	0.33 (1.69)	0.37 (1.92)	0.37 (2.00)	0.42 (2.33)	0.34 (1.83)	0.34 (1.79)	0.32 (1.64)	0.37 (1.85)	0.35 (1.74)	1.35	1.55
General Industrial Production Index	5.614	4.57	0.54 (4.23)	0.63 (5.34)	0.72 (6.87)	0.78 (8.40)	0.79 (8.78)	0.74 (7.54)	0.60 (5.20)	0.42 (3.15)	0.20 (1.38)	0.00 (−0.03)	−0.20 (−1.35)	1.80	7.03
Energy and Water IPI	2.350	1.91	−0.16 (−1.03)	0.01 (0.07)	0.17 (1.16)	0.30 (2.13)	0.38 (2.84)	0.42 (3.25)	0.45 (3.43)	0.46 (3.50)	0.42 (3.08)	0.40 (2.88)	0.39 (2.77)	2.37	2.98
Mining and chemical IPI	3.589	2.92	0.33 (2.28)	0.43 (3.18)	0.53 (4.22)	0.58 (4.87)	0.58 (4.83)	0.51 (4.05)	0.38 (2.79)	0.23 (1.57)	0.04 (0.24)	−0.12 (−0.78)	−0.25 (−1.68)	3.23	2.60
Metal and Precision IPI	5.614	4.57	0.54 (4.23)	0.63 (5.34)	0.72 (6.87)	0.78 (8.40)	0.79 (8.78)	0.74 (7.54)	0.60 (5.20)	0.42 (3.15)	0.20 (1.38)	0.00 (−0.03)	−0.20 (−1.35)	1.80	7.03
Other Manufacturing IPI	2.464	2.00	0.27 (1.86)	0.40 (2.88)	0.52 (4.08)	0.58 (4.85)	0.56 (4.58)	0.46 (3.60)	0.29 (2.09)	0.12 (0.85)	−0.07 (−0.46)	−0.18 (−1.22)	−0.24 (−1.64)	2.49	2.74
Aggregate Employment and Productivity															
Labour Force	0.436	0.35	0.74 (7.23)	0.75 (7.53)	0.73 (7.20)	0.68 (6.24)	0.60 (5.16)	0.51 (4.13)	0.39 (2.87)	0.27 (1.89)	0.16 (1.05)	0.07 (0.48)	0.00 (−0.01)	3.80	2.82
Employment	1.921	1.56	0.36 (2.53)	0.52 (4.01)	0.67 (5.99)	0.79 (8.76)	0.88 (12.85)	0.93 (18.25)	0.94 (19.53)	0.91 (14.97)	0.84 (10.19)	0.73 (7.06)	0.60 (4.89)	2.83	1.88
Government Employment	2.977	2.42	−0.09 (−0.60)	−0.01 (−0.07)	0.06 (0.43)	0.13 (0.91)	0.21 (1.44)	0.28 (2.01)	0.38 (2.85)	0.51 (3.99)	0.61 (5.22)	0.69 (6.32)	0.68 (6.13)	0.68	1.23
Activity Rate	0.392	0.32	0.63 (5.37)	0.65 (5.66)	0.63 (5.49)	0.58 (4.83)	0.51 (4.05)	0.43 (3.27)	0.31 (2.24)	0.21 (1.48)	0.13 (0.86)	0.08 (0.55)	0.06 (0.36)	2.18	3.52
Unemployment Rate	6.947	5.65	−0.25 (−1.68)	−0.42 (−3.07)	−0.58 (−4.82)	−0.72 (−7.11)	−0.83 (−10.19)	−0.90 (−13.93)	−0.92 (−16.13)	−0.90 (−14.25)	−0.84 (−10.46)	−0.75 (−7.46)	−0.63 (−5.30)	1.31	2.60
Average Hours Wage-earners	0.730	0.59	0.07 (0.49)	0.04 (0.25)	−0.02 (−0.14)	−0.09 (−0.60)	−0.12 (−0.86)	−0.15 (−1.02)	−0.27 (−1.89)	−0.25 (−1.76)	−0.25 (−1.73)	−0.32 (−2.26)	−0.45 (−3.33)	0.18	4.83
Average Hours Employees	0.436	0.35	0.01 (0.05)	0.04 (0.26)	0.02 (0.10)	−0.01 (−0.09)	−0.02 (−0.13)	−0.01 (−0.10)	0.03 (0.24)	0.06 (0.42)	0.09 (0.59)	0.13 (0.84)	0.15 (0.96)	0.95	1.02
Total Hours Wage-earners	2.443	1.99	0.42 (3.04)	0.57 (4.61)	0.69 (6.48)	0.79 (8.62)	0.85 (11.08)	0.88 (13.15)	0.88 (12.55)	0.85 (11.07)	0.79 (8.50)	0.66 (5.90)	0.51 (3.85)	1.85	7.90
Total Hours Employees	1.973	1.60	0.35 (2.45)	0.51 (3.92)	0.65 (5.73)	0.77 (8.09)	0.85 (11.27)	0.91 (14.89)	0.92 (16.15)	0.89 (13.36)	0.82 (9.76)	0.73 (7.02)	0.61 (4.99)	1.94	5.46
Labour Productivity Wage-earners	1.693	1.38	−0.30 (−2.06)	−0.42 (−3.06)	−0.50 (−3.85)	−0.53 (−4.28)	−0.55 (−4.47)	−0.55 (−4.57)	−0.55 (−4.49)	−0.61 (−5.21)	−0.65 (−5.78)	−0.65 (−5.71)	−0.56 (−4.47)	2.03	2.35
Labour Productivity Employees	2.159	1.76	−0.12 (−0.80)	−0.17 (−1.17)	−0.19 (−1.27)	−0.22 (−1.53)	−0.25 (−1.79)	−0.26 (−1.89)	−0.27 (−1.92)	−0.28 (−1.98)	−0.36 (−2.58)	−0.38 (−2.68)	−0.35 (−2.44)	1.17	2.64
Capacity Utilization	2.703	2.20	0.56 (4.44)	0.64 (5.46)	0.68 (6.30)	0.69 (6.49)	0.65 (5.85)	0.56 (4.65)	0.41 (3.10)	0.25 (1.77)	0.07 (0.45)	−0.10 (−0.70)	−0.28 (−1.88)	0.84	1.23
Total Factor Productivity (epa)	0.711	0.58	0.37 (2.57)	0.32 (2.27)	0.29 (2.02)	0.25 (1.72)	0.18 (1.28)	0.09 (0.60)	−0.10 (−0.66)	−0.31 (−2.20)	−0.51 (−3.96)	−0.68 (−6.11)	−0.78 (−8.04)	1.70	2.31
Total Factor Productivity (es)	0.843	0.69	0.02 (0.11)	−0.06 (−0.38)	−0.10 (−0.68)	−0.12 (−0.84)	−0.16 (−1.08)	−0.22 (−1.56)	−0.29 (−2.08)	−0.50 (−3.92)	−0.69 (−6.48)	−0.78 (−8.29)	−0.75 (−7.43)	1.04	2.40
Vacancies	21.783	17.51	0.50 (3.72)	0.48 (3.58)	0.46 (3.42)	0.47 (3.49)	0.46 (3.51)	0.44 (3.36)	0.47 (3.60)	0.48 (3.66)	0.42 (3.07)	0.31 (2.09)	0.16 (1.04)	2.52	1.59
Prices and Wages															
Consumer Price Index	0.796	0.65	−0.48 (−3.55)	−0.48 (−3.63)	−0.48 (−3.68)	−0.47 (−3.63)	−0.45 (−3.46)	−0.41 (−3.12)	−0.34 (−2.50)	−0.29 (−2.02)	−0.20 (−1.36)	−0.10 (−0.65)	−0.02 (−0.11)	0.84	1.18
Producer Price Index	1.497	1.22	0.13 (0.83)	0.13 (0.84)	0.12 (0.79)	0.11 (0.74)	0.10 (0.66)	0.07 (0.50)	0.07 (0.49)	0.03 (0.21)	−0.05 (−0.30)	−0.15 (−1.03)	−0.28 (−1.89)	0.04	1.32
GDP Price Deflactor	0.884	0.72	−0.64 (−5.52)	−0.66 (−5.88)	−0.65 (−5.75)	−0.61 (−5.18)	−0.54 (−4.39)	−0.46 (−3.60)	−0.35 (−2.56)	−0.21 (−1.46)	−0.07 (−0.48)	0.08 (0.52)	0.19 (1.29)	1.64	1.18
Inflation Rate (CPI)	0.412	0.34	−0.03 (−0.19)	−0.01 (−0.04)	−0.01 (−0.05)	0.01 (0.07)	0.04 (0.25)	0.07 (0.51)	0.18 (1.28)	0.15 (1.05)	0.21 (1.44)	0.22 (1.49)	0.17 (1.16)	0.41	1.66
Inflation Rate (PPI)	0.547	0.44	0.12 (0.79)	0.15 (1.00)	0.18 (1.22)	0.19 (1.30)	0.17 (1.21)	0.13 (0.89)	−0.01 (−0.07)	−0.12 (−0.84)	−0.26 (−1.77)	−0.38 (−2.76)	−0.43 (−3.15)	0.07	1.27

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Inflation Rate (DGDP)	27.811	22.62	−0.12 (−0.79)	−0.08 (−0.56)	−0.02 (−0.15)	0.06 (0.42)	0.13 (0.89)	0.15 (1.09)	0.24 (1.73)	0.31 (2.19)	0.28 (1.92)	0.25 (1.75)	0.15 (0.98)	0.86	1.15
Unitary Labour Cost Index	2.478	2.02	−0.65 (−5.57)	−0.63 (−5.38)	−0.59 (−4.85)	−0.51 (−4.01)	−0.40 (−2.98)	−0.26 (−1.85)	−0.09 (−0.64)	0.09 (0.64)	0.29 (2.01)	0.46 (3.46)	0.61 (5.06)	2.30	4.54
Average Earnings per Hour	1.120	0.91	−0.52 (−4.01)	−0.57 (−4.57)	−0.58 (−4.83)	−0.56 (−4.54)	−0.52 (−4.18)	−0.46 (−3.58)	−0.36 (−2.62)	−0.26 (−1.79)	−0.07 (−0.46)	0.08 (0.55)	0.27 (1.86)	1.92	3.11
Real Average Earnings per Hour	0.918	0.75	−0.22 (−1.44)	−0.26 (−1.81)	−0.28 (−1.96)	−0.25 (−1.76)	−0.23 (−1.59)	−0.18 (−1.29)	−0.02 (−0.15)	0.02 (0.16)	0.14 (0.96)	0.21 (1.45)	0.35 (2.43)	1.14	2.91
ULCI Growth Rate	0.761	0.62	−0.02 (−0.13)	0.00 (0.01)	0.06 (0.43)	0.17 (1.15)	0.27 (1.95)	0.40 (2.98)	0.50 (3.94)	0.56 (4.54)	0.58 (4.76)	0.53 (4.20)	0.46 (3.44)	0.67	3.97
AEH Growth Rate	1.309	1.06	−0.05 (−0.33)	−0.05 (−0.33)	−0.03 (−0.23)	0.00 (0.00)	0.01 (0.05)	0.03 (0.22)	0.23 (1.64)	0.17 (1.20)	0.32 (2.30)	0.27 (1.88)	0.35 (2.45)	1.03	3.58
RAEH Growth Rate	1.198	0.97	−0.04 (−0.29)	−0.05 (−0.34)	−0.04 (−0.24)	0.00 (−0.02)	−0.01 (−0.04)	0.01 (0.06)	0.16 (1.13)	0.07 (0.47)	0.16 (1.06)	0.09 (0.63)	0.20 (1.31)	1.43	2.44
Money															
M2	2.948	2.40	−0.16 (−1.08)	0.06 (0.37)	0.27 (1.85)	0.45 (3.37)	0.58 (4.90)	0.66 (6.16)	0.70 (6.79)	0.71 (6.88)	0.69 (6.44)	0.66 (5.88)	0.63 (5.31)	2.86	2.43
Monetary Base	7.403	6.02	−0.03 (−0.16)	−0.04 (−0.29)	−0.05 (−0.36)	−0.07 (−0.45)	−0.08 (−0.55)	−0.10 (−0.69)	−0.11 (−0.75)	−0.14 (−0.97)	−0.18 (−1.24)	−0.21 (−1.40)	−0.21 (−1.44)	1.03	0.20
Real M2	3.099	2.52	0.03 (0.19)	0.24 (1.66)	0.44 (3.28)	0.60 (5.06)	0.71 (6.87)	0.76 (8.19)	0.77 (8.29)	0.74 (7.49)	0.69 (6.38)	0.63 (5.37)	0.57 (4.59)	2.28	3.06
Real Monetary Base	7.563	6.15	0.05 (0.33)	0.04 (0.23)	0.02 (0.16)	0.01 (0.04)	−0.02 (−0.10)	−0.04 (−0.30)	−0.07 (−0.45)	−0.11 (−0.78)	−0.17 (−1.15)	−0.21 (−1.42)	−0.23 (−1.53)	1.09	0.21
M2 Growth Rate	1.147	0.93	0.50 (3.76)	0.52 (4.05)	0.49 (3.78)	0.42 (3.15)	0.32 (2.32)	0.19 (1.34)	0.11 (0.74)	0.03 (0.19)	−0.05 (−0.31)	−0.07 (−0.48)	−0.09 (−0.61)	1.64	1.51
Monetary Base Growth Rate	5.402	4.39	−0.08 (−0.53)	0.00 (−0.01)	0.02 (0.12)	0.02 (0.11)	0.01 (0.10)	0.00 (0.03)	−0.01 (−0.10)	−0.05 (−0.33)	−0.06 (−0.39)	−0.04 (−0.24)	−0.01 (−0.08)	1.69	0.07

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 31: Descriptive Statistics for Baxter-King Cyclical Componets of Series.
1986-1998.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Components of GDP															
GDP	1.157	1	0.38 (2.62)	0.55 (4.27)	0.72 (6.86)	0.87 (11.66)	0.97 (25.13)	1.00 (−)	0.97 (25.13)	0.87 (11.66)	0.72 (6.86)	0.55 (4.27)	0.38 (2.62)	-	-
Aggregate Consumption	1.225	1.05	0.10 (0.63)	0.27 (1.82)	0.47 (3.48)	0.66 (5.77)	0.80 (8.85)	0.87 (12.10)	0.88 (12.73)	0.85 (10.55)	0.77 (7.97)	0.68 (6.09)	0.60 (4.80)	4.64	9.12
Durables Consumption	3.997	3.45	0.30 (1.99)	0.37 (2.62)	0.48 (3.62)	0.59 (4.82)	0.65 (5.79)	0.66 (5.90)	0.58 (4.82)	0.46 (3.43)	0.32 (2.20)	0.20 (1.32)	0.13 (0.85)	2.58	2.83
Non Durables Consumption	1.053	0.91	−0.02 (−0.12)	0.17 (1.10)	0.37 (2.65)	0.57 (4.59)	0.73 (7.09)	0.83 (10.23)	0.89 (12.94)	0.90 (13.95)	0.88 (12.32)	0.83 (9.82)	0.76 (7.57)	12.22	8.91
Government Expenditure	1.195	1.03	−0.31 (−2.08)	−0.20 (−1.33)	−0.07 (−0.45)	0.08 (0.51)	0.22 (1.51)	0.35 (2.50)	0.42 (3.13)	0.49 (3.71)	0.54 (4.20)	0.58 (4.62)	0.63 (5.13)	6.58	9.57
Gross Fixed Investment	4.557	3.93	0.41 (2.84)	0.57 (4.52)	0.74 (7.17)	0.87 (11.74)	0.95 (19.91)	0.96 (22.79)	0.90 (13.98)	0.79 (8.42)	0.63 (5.28)	0.45 (3.25)	0.27 (1.77)	6.34	10.14
Change in Inventories	0.221	0.19	0.04 (0.25)	0.12 (0.77)	0.25 (1.66)	0.40 (2.87)	0.54 (4.27)	0.63 (5.52)	0.64 (5.65)	0.57 (4.61)	0.42 (3.00)	0.21 (1.36)	−0.02 (−0.13)	15.97	11.30
Investment	5.256	4.54	0.36 (2.46)	0.52 (3.91)	0.68 (6.12)	0.82 (9.65)	0.92 (15.39)	0.95 (19.60)	0.90 (13.94)	0.79 (8.49)	0.62 (5.21)	0.43 (3.06)	0.23 (1.50)	2.17	6.21
Exports	1.876	1.62	0.14 (0.92)	0.17 (1.15)	0.19 (1.26)	0.16 (1.10)	0.08 (0.56)	−0.05 (−0.33)	−0.22 (−1.50)	−0.42 (−3.08)	−0.61 (−5.09)	−0.74 (−7.20)	−0.78 (−7.97)	7.92	8.96
Imports	3.640	3.14	0.24 (1.60)	0.41 (2.95)	0.60 (4.97)	0.76 (7.88)	0.85 (11.05)	0.85 (11.10)	0.77 (8.00)	0.61 (5.07)	0.42 (3.02)	0.25 (1.66)	0.12 (0.75)	14.10	26.54
Net Exports	0.891	0.77	0.00 (0.03)	−0.16 (−1.05)	−0.36 (−2.54)	−0.56 (−4.49)	−0.72 (−6.97)	−0.82 (−9.69)	−0.85 (−10.80)	−0.82 (−9.48)	−0.74 (−7.29)	−0.64 (−5.45)	−0.53 (−3.99)	11.02	11.33
Sectoral Employment and Output															
Agriculture GVA	5.579	4.92	0.12 (0.79)	0.11 (0.74)	0.10 (0.66)	0.10 (0.67)	0.12 (0.81)	0.16 (1.10)	0.19 (1.32)	0.22 (1.54)	0.26 (1.84)	0.32 (2.22)	0.37 (2.60)	3.17	6.57
Industry GVA	1.555	1.37	0.34 (2.35)	0.50 (3.85)	0.67 (6.04)	0.80 (8.97)	0.86 (11.44)	0.84 (10.69)	0.75 (7.78)	0.59 (4.98)	0.39 (2.86)	0.19 (1.27)	0.01 (0.09)	5.92	6.06
Construction GVA	3.908	3.45	0.31 (2.10)	0.47 (3.55)	0.62 (5.29)	0.73 (7.25)	0.80 (9.07)	0.82 (9.96)	0.80 (9.08)	0.73 (7.35)	0.64 (5.52)	0.51 (3.93)	0.37 (2.60)	3.55	5.88
Non Sale Services GVA	1.156	1.02	−0.17 (−1.14)	−0.03 (−0.17)	0.14 (0.94)	0.31 (2.23)	0.48 (3.75)	0.63 (5.57)	0.75 (7.66)	0.83 (10.13)	0.87 (11.89)	0.86 (10.99)	0.79 (8.54)	5.14	3.07
Sale Services GVA	0.738	0.65	0.50 (3.80)	0.66 (5.76)	0.80 (8.93)	0.90 (14.29)	0.95 (20.19)	0.92 (16.41)	0.82 (9.98)	0.67 (6.11)	0.48 (3.69)	0.30 (2.05)	0.13 (0.88)	1.30	3.07
Agricultural Employment	1.932	1.70	0.74 (7.17)	0.70 (6.51)	0.64 (5.61)	0.57 (4.71)	0.50 (3.92)	0.42 (3.20)	0.32 (2.35)	0.20 (1.38)	0.06 (0.42)	−0.07 (−0.47)	−0.18 (−1.20)	2.71	0.60
Industrial Employment	2.659	2.34	0.25 (1.69)	0.39 (2.83)	0.55 (4.44)	0.70 (6.67)	0.82 (9.67)	0.88 (12.78)	0.89 (13.21)	0.84 (10.49)	0.74 (7.48)	0.62 (5.26)	0.50 (3.74)	1.03	4.86
Construction Employment	4.549	4.01	0.30 (2.06)	0.48 (3.63)	0.64 (5.65)	0.77 (8.26)	0.86 (11.45)	0.90 (14.42)	0.91 (14.65)	0.87 (11.81)	0.78 (8.42)	0.66 (5.79)	0.51 (3.86)	2.09	4.52
Services Employment	1.415	1.25	0.33 (2.31)	0.48 (3.62)	0.62 (5.28)	0.73 (7.32)	0.81 (9.63)	0.86 (11.53)	0.86 (11.48)	0.82 (9.83)	0.75 (7.60)	0.64 (5.59)	0.52 (3.99)	2.05	5.48
Agriculture, Livestock and Fishing Emp.	2.338	2.06	0.82 (6.66)	0.77 (5.61)	0.69 (4.62)	0.62 (3.90)	0.56 (3.36)	0.49 (2.88)	0.40 (2.18)	0.24 (1.19)	0.02 (0.12)	−0.22 (−1.07)	−0.46 (−2.36)	10.60	8.43
Energy and Water Employment	4.098	3.60	0.45 (2.32)	0.50 (2.68)	0.47 (2.55)	0.42 (2.29)	0.38 (2.07)	0.36 (1.94)	0.38 (2.08)	0.41 (2.21)	0.43 (2.25)	0.42 (2.15)	0.37 (1.83)	16.34	8.69
Mining and Chemical Employment	2.943	2.59	0.36 (1.79)	0.45 (2.34)	0.49 (2.73)	0.54 (3.12)	0.58 (3.58)	0.62 (4.02)	0.63 (4.09)	0.67 (4.46)	0.72 (4.94)	0.74 (5.10)	0.71 (4.68)	9.62	2.99
Metal and Precision Employment	2.555	2.25	0.80 (6.19)	0.74 (5.21)	0.71 (4.81)	0.74 (5.31)	0.80 (6.69)	0.85 (8.08)	0.79 (6.49)	0.67 (4.43)	0.51 (2.86)	0.34 (1.72)	0.20 (0.95)	10.15	5.75
Other Manufacturing Employment	1.895	1.67	0.49 (2.59)	0.60 (3.51)	0.72 (4.91)	0.82 (6.90)	0.87 (8.71)	0.84 (7.93)	0.70 (4.91)	0.50 (2.81)	0.27 (1.34)	0.06 (0.30)	−0.04 (−0.17)	7.70	3.38
Construction Employment	4.220	3.71	0.57 (3.20)	0.72 (4.84)	0.85 (7.63)	0.93 (12.50)	0.96 (17.10)	0.93 (13.44)	0.86 (8.47)	0.77 (5.94)	0.70 (4.74)	0.66 (4.16)	0.63 (3.70)	19.34	41.11
Commerce and Hotel Employment	1.621	1.43	0.49 (2.56)	0.62 (3.66)	0.74 (5.24)	0.83 (7.26)	0.87 (8.96)	0.86 (8.42)	0.74 (5.56)	0.58 (3.51)	0.39 (2.06)	0.19 (0.91)	0.01 (0.04)	7.78	8.64

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are H_0 : x_t show no Granger causality to y_t y H_0 : y_t show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Communication and Transport Employment	2.357	2.07	0.36 (1.76)	0.38 (1.91)	0.41 (2.14)	0.46 (2.54)	0.52 (3.02)	0.56 (3.42)	0.57 (3.50)	0.57 (3.40)	0.57 (3.31)	0.59 (3.39)	0.62 (3.60)	6.05	5.92
Finance and Insurance Employment	1.605	1.41	0.30 (1.45)	0.51 (2.75)	0.65 (4.15)	0.73 (5.19)	0.75 (5.62)	0.73 (5.47)	0.64 (4.19)	0.54 (3.15)	0.43 (2.30)	0.31 (1.53)	0.18 (0.85)	20.78	9.04
Others Services Employment	0.986	0.87	0.11 (0.53)	0.23 (1.09)	0.33 (1.68)	0.41 (2.17)	0.44 (2.46)	0.44 (2.52)	0.38 (2.03)	0.35 (1.82)	0.34 (1.74)	0.34 (1.71)	0.36 (1.79)	6.03	4.72
General Industrial Production Index	2.654	2.34	0.39 (2.82)	0.54 (4.29)	0.68 (6.23)	0.76 (8.03)	0.77 (8.24)	0.69 (6.64)	0.54 (4.45)	0.33 (2.40)	0.10 (0.66)	−0.11 (−0.73)	−0.26 (−1.74)	4.04	7.56
Energy and Water IPI	1.809	1.60	−0.10 (−0.66)	0.08 (0.50)	0.25 (1.75)	0.40 (2.92)	0.49 (3.81)	0.51 (4.13)	0.55 (4.50)	0.52 (4.15)	0.47 (3.58)	0.43 (3.16)	0.41 (2.94)	2.91	3.45
Mining and chemical IPI	3.400	3.00	0.32 (2.19)	0.43 (3.18)	0.53 (4.17)	0.57 (4.74)	0.56 (4.58)	0.48 (3.76)	0.36 (2.67)	0.19 (1.31)	−0.01 (−0.05)	−0.18 (−1.23)	−0.31 (−2.12)	1.50	4.78
Metal and Precision IPI	4.818	4.25	0.47 (3.53)	0.58 (4.72)	0.69 (6.40)	0.77 (8.21)	0.79 (8.94)	0.74 (7.70)	0.62 (5.37)	0.42 (3.17)	0.19 (1.27)	−0.05 (−0.36)	−0.26 (−1.77)	5.47	9.06
Other Manufacturing IPI	2.251	1.98	0.29 (1.99)	0.44 (3.28)	0.57 (4.65)	0.63 (5.45)	0.59 (5.07)	0.48 (3.79)	0.29 (2.09)	0.07 (0.47)	−0.14 (−0.92)	−0.27 (−1.86)	−0.31 (−2.17)	5.05	2.83
Aggregate Employment and Productivity															
Labour Force	0.395	0.35	0.69 (6.31)	0.70 (6.51)	0.68 (6.27)	0.64 (5.59)	0.56 (4.66)	0.47 (3.67)	0.34 (2.48)	0.22 (1.53)	0.12 (0.80)	0.04 (0.27)	−0.02 (−0.13)	5.89	0.77
Employment	1.715	1.51	0.35 (2.41)	0.50 (3.86)	0.65 (5.80)	0.78 (8.47)	0.87 (12.20)	0.92 (16.45)	0.92 (16.67)	0.88 (12.80)	0.80 (8.97)	0.68 (6.24)	0.55 (4.30)	2.28	4.56
Government Employment	2.780	2.45	−0.07 (−0.49)	−0.01 (−0.09)	0.04 (0.26)	0.09 (0.60)	0.14 (0.97)	0.20 (1.43)	0.33 (2.39)	0.47 (3.65)	0.60 (5.09)	0.68 (6.16)	0.69 (6.19)	6.32	2.18
Activity Rate	0.357	0.31	0.59 (4.83)	0.61 (5.10)	0.59 (4.96)	0.55 (4.42)	0.47 (3.65)	0.38 (2.81)	0.25 (1.74)	0.14 (0.94)	0.06 (0.41)	0.02 (0.13)	0.01 (0.04)	2.35	0.67
Unemployment Rate	6.388	5.63	−0.24 (−1.59)	−0.41 (−3.00)	−0.58 (−4.78)	−0.72 (−7.08)	−0.83 (−10.05)	−0.89 (−13.39)	−0.91 (−14.65)	−0.88 (−12.44)	−0.81 (−9.18)	−0.70 (−6.56)	−0.58 (−4.66)	2.17	6.33
Average Hours Wage-earners	0.512	0.45	−0.03 (−0.21)	−0.09 (−0.62)	−0.15 (−1.02)	−0.20 (−1.37)	−0.23 (−1.61)	−0.25 (−1.77)	−0.27 (−1.89)	−0.26 (−1.86)	−0.29 (−2.05)	−0.37 (−2.65)	−0.49 (−3.66)	0.83	3.63
Average Hours Employees	0.398	0.35	0.04 (0.29)	0.05 (0.34)	0.01 (0.06)	−0.05 (−0.32)	−0.08 (−0.58)	−0.09 (−0.63)	−0.02 (−0.11)	0.04 (0.29)	0.06 (0.39)	0.06 (0.42)	0.10 (0.64)	2.13	2.38
Total Hours Wage-earners	2.105	1.86	0.40 (2.88)	0.56 (4.45)	0.69 (6.41)	0.79 (8.77)	0.85 (11.29)	0.88 (13.05)	0.87 (12.26)	0.83 (10.10)	0.75 (7.56)	0.62 (5.27)	0.46 (3.43)	2.90	4.04
Total Hours Employees	1.749	1.54	0.35 (2.44)	0.50 (3.87)	0.64 (5.64)	0.76 (7.81)	0.84 (10.44)	0.88 (13.03)	0.89 (13.66)	0.86 (11.44)	0.78 (8.39)	0.67 (5.99)	0.55 (4.28)	2.76	6.28
Labour Productivity Wage-earners	1.226	1.08	−0.37 (−2.65)	−0.48 (−3.62)	−0.54 (−4.35)	−0.58 (−4.77)	−0.59 (−5.02)	−0.60 (−5.25)	−0.62 (−5.35)	−0.65 (−5.77)	−0.66 (−5.94)	−0.61 (−5.06)	−0.48 (−3.55)	2.60	2.50
Labour Productivity Employees	0.962	0.85	−0.24 (−1.63)	−0.32 (−2.22)	−0.36 (−2.62)	−0.39 (−2.88)	−0.42 (−3.14)	−0.45 (−3.48)	−0.51 (−4.02)	−0.56 (−4.61)	−0.59 (−4.85)	−0.57 (−4.63)	−0.53 (−4.05)	1.65	1.83
Capacity Utilization	2.443	2.15	0.55 (4.30)	0.63 (5.37)	0.68 (6.21)	0.68 (6.32)	0.63 (5.58)	0.53 (4.35)	0.39 (2.90)	0.21 (1.49)	0.02 (0.14)	−0.17 (−1.14)	−0.34 (−2.35)	1.93	2.25
Total Factor Productivity (epa)	0.666	0.59	0.28 (1.95)	0.27 (1.88)	0.28 (1.95)	0.28 (1.95)	0.24 (1.70)	0.16 (1.10)	−0.02 (−0.12)	−0.25 (−1.72)	−0.48 (−3.65)	−0.66 (−5.80)	−0.76 (−7.69)	2.32	3.33
Total Factor Productivity (es)	0.714	0.63	0.02 (0.13)	−0.04 (−0.27)	−0.06 (−0.43)	−0.07 (−0.47)	−0.09 (−0.61)	−0.14 (−1.01)	−0.26 (−1.84)	−0.45 (−3.37)	−0.64 (−5.61)	−0.75 (−7.50)	−0.73 (−6.99)	2.99	4.33
Vacancies	19.774	17.18	0.48 (3.55)	0.47 (3.41)	0.44 (3.20)	0.42 (3.06)	0.41 (3.06)	0.42 (3.16)	0.49 (3.72)	0.50 (3.82)	0.45 (3.30)	0.34 (2.37)	0.20 (1.29)	1.99	4.47
Precios y salarios															
Consumer Price Index	0.721	0.64	−0.39 (−2.77)	−0.40 (−2.93)	−0.42 (−3.09)	−0.43 (−3.21)	−0.43 (−3.28)	−0.42 (−3.23)	−0.37 (−2.73)	−0.30 (−2.11)	−0.20 (−1.40)	−0.10 (−0.65)	0.00 (0.02)	2.63	0.99
Producer Price Index	1.359	1.20	0.24 (1.64)	0.22 (1.53)	0.19 (1.32)	0.15 (1.06)	0.11 (0.79)	0.07 (0.50)	0.10 (0.66)	0.06 (0.42)	−0.02 (−0.16)	−0.15 (−0.99)	−0.29 (−1.98)	0.14	3.40
GDP Price Deflactor	0.853	0.75	−0.58 (−4.62)	−0.59 (−4.87)	−0.58 (−4.79)	−0.55 (−4.43)	−0.49 (−3.88)	−0.42 (−3.22)	−0.31 (−2.23)	−0.17 (−1.14)	0.00 (−0.03)	0.16 (1.06)	0.28 (1.90)	4.87	2.80
Inflation Rate (CPI)	0.229	0.20	−0.01 (−0.05)	0.03 (0.19)	0.05 (0.36)	0.07 (0.49)	0.09 (0.65)	0.12 (0.86)	0.21 (1.48)	0.29 (2.05)	0.33 (2.33)	0.32 (2.23)	0.27 (1.86)	1.04	1.82
Inflation Rate (PPI)	0.518	0.46	0.11 (0.75)	0.15 (1.02)	0.19 (1.29)	0.21 (1.43)	0.20 (1.37)	0.15 (1.06)	0.04 (0.29)	−0.11 (−0.72)	−0.27 (−1.91)	−0.41 (−2.96)	−0.47 (−3.45)	1.21	1.37

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

			Cross Correlations between GDP(t) and x(t+l)												
Serie	s.d(%)	σ_x/σ_y	l=-5	l=-4	l=-3	l=-2	l=-1	l=0	l=1	l=2	l=3	l=4	l=5	$F_{x_t \to y_t}$	$F_{y_t \to x_t}$
Inflation Rate (DGDP)	23.483	20.71	−0.12 (−0.77)	−0.06 (−0.37)	0.01 (0.08)	0.08 (0.57)	0.15 (1.03)	0.20 (1.41)	0.31 (2.26)	0.38 (2.81)	0.37 (2.69)	0.29 (2.01)	0.16 (1.09)	4.04	4.88
Unitary Labour Cost Index	2.232	1.97	−0.54 (−4.19)	−0.54 (−4.25)	−0.52 (−4.03)	−0.45 (−3.46)	−0.36 (−2.61)	−0.23 (−1.61)	−0.06 (−0.44)	0.12 (0.85)	0.32 (2.24)	0.49 (3.76)	0.64 (5.45)	3.19	6.33
Average Earnings per Hour	0.762	0.67	−0.57 (−4.56)	−0.61 (−5.10)	−0.63 (−5.43)	−0.62 (−5.43)	−0.60 (−5.16)	−0.55 (−4.54)	−0.44 (−3.37)	−0.29 (−2.04)	−0.08 (−0.55)	0.15 (1.01)	0.34 (2.33)	2.62	1.79
Real Average Earnings per Hour	0.611	0.54	−0.25 (−1.72)	−0.28 (−1.97)	−0.29 (−2.06)	−0.28 (−1.95)	−0.24 (−1.71)	−0.19 (−1.31)	−0.12 (−0.85)	−0.03 (−0.20)	0.11 (0.74)	0.26 (1.77)	0.36 (2.56)	0.80	3.07
ULCI Growth Rate	0.685	0.60	−0.04 (−0.26)	−0.03 (−0.23)	0.03 (0.17)	0.13 (0.88)	0.26 (1.81)	0.38 (2.88)	0.50 (3.94)	0.57 (4.68)	0.59 (4.85)	0.55 (4.42)	0.48 (3.59)	1.73	4.97
AEH Growth Rate	0.360	0.32	−0.06 (−0.39)	−0.02 (−0.15)	0.03 (0.17)	0.08 (0.53)	0.12 (0.85)	0.18 (1.30)	0.24 (1.73)	0.34 (2.48)	0.45 (3.40)	0.45 (3.38)	0.36 (2.57)	1.47	4.58
RAEH Growth Rate	0.358	0.32	−0.06 (−0.37)	−0.04 (−0.28)	−0.01 (−0.06)	0.03 (0.21)	0.06 (0.44)	0.11 (0.74)	0.12 (0.81)	0.17 (1.19)	0.25 (1.76)	0.26 (1.82)	0.19 (1.27)	1.10	4.06
Money															
M2	2.755	2.43	−0.14 (−0.90)	0.09 (0.61)	0.31 (2.17)	0.49 (3.76)	0.61 (5.25)	0.68 (6.35)	0.70 (6.63)	0.68 (6.36)	0.65 (5.77)	0.61 (5.12)	0.57 (4.53)	3.84	6.53
Monetary Base	7.067	6.23	0.00 (0.01)	−0.03 (−0.18)	−0.03 (−0.20)	−0.03 (−0.18)	−0.03 (−0.18)	−0.03 (−0.22)	−0.03 (−0.22)	−0.05 (−0.34)	−0.08 (−0.54)	−0.11 (−0.74)	−0.13 (−0.86)	5.79	2.62
Real M2	2.865	2.53	0.04 (0.26)	0.26 (1.81)	0.47 (3.56)	0.63 (5.50)	0.73 (7.36)	0.78 (8.50)	0.76 (8.10)	0.71 (6.91)	0.64 (5.63)	0.57 (4.60)	0.51 (3.86)	3.62	5.98
Real Monetary Base	7.270	6.41	0.07 (0.45)	0.04 (0.29)	0.04 (0.26)	0.04 (0.26)	0.03 (0.23)	0.02 (0.13)	0.00 (0.03)	−0.03 (−0.21)	−0.08 (−0.52)	−0.12 (−0.81)	−0.15 (−1.00)	5.54	2.73
M2 Growth Rate	0.936	0.83	0.58 (4.68)	0.62 (5.25)	0.58 (4.77)	0.47 (3.64)	0.33 (2.38)	0.17 (1.22)	0.06 (0.39)	−0.03 (−0.23)	−0.09 (−0.62)	−0.12 (−0.81)	−0.13 (−0.88)	3.49	4.25
Monetary Base Growth Rate	3.976	3.51	−0.10 (−0.69)	−0.02 (−0.11)	0.04 (0.25)	0.06 (0.38)	0.05 (0.35)	0.03 (0.23)	0.00 (−0.02)	−0.04 (−0.25)	−0.06 (−0.39)	−0.06 (−0.38)	−0.04 (−0.23)	3.72	1.21

Notes: Values in brackets are the t-statistic for statistic testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$. The last two columns show the F-statistic for statistic testing if x_t show Granger causality to GDP ($F_{x_t \to y_t}$) and if GDP show Granger causality to x_t ($F_{y_t \to x_t}$). The nulls are $H_0 : x_t$ show no Granger causality to y_t y $H_0 : y_t$ show no Granger causality to x_t respectively, the critical values of $F_{5,100}$ at 5 and 1% are 2.30 and 3.20 respectively.

Table 32: Correlaciones de empleo y producci'on sectorial. Primeras diferencias. 1970.1-1985.4

	GDP	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	GVAag	GVAin	GVAco	GVAsnv	GVAsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00 (−)	0.20 (1.19)	−0.03 (−0.18)	−0.31 (−1.94)	0.06 (0.38)	0.04 (0.23)	0.28 (1.76)	0.16 (0.98)	−0.13 (−0.76)	0.23 (1.37)	0.10 (0.60)	0.29 (1.94)	0.02 (0.14)	−0.02 (−0.13)	0.29 (1.94)	0.02 (0.15)	0.33 (2.73)	0.91 (16.98)	0.74 (8.69)	0.51 (4.65)	0.87 (13.87)	0.17 (1.00)	−0.11 (−0.65)	0.32 (1.97)	0.16 (0.98)
EMPag	0.20 (1.19)	1.00 (−)	−0.03 (−0.16)	−0.50 (−3.39)	−0.05 (−0.32)	−0.25 (−1.50)	−0.10 (−0.58)	−0.28 (−1.71)	−0.13 (−0.78)	0.01 (0.04)	−0.13 (−0.80)	−0.03 (−0.19)	−0.06 (−0.34)	−0.28 (−1.72)	−0.03 (−0.19)	0.08 (0.49)	0.33 (2.06)	0.03 (0.17)	0.20 (1.19)	0.18 (1.10)	−0.05 (−0.27)	0.98 (28.75)	−0.24 (−1.46)	−0.15 (−0.87)	−0.21 (−1.27)
EMPen	−0.03 (−0.18)	−0.03 (−0.16)	1.00 (−)	0.12 (0.70)	0.08 (0.50)	−0.15 (−0.88)	−0.09 (−0.55)	−0.28 (−1.70)	−0.32 (−1.97)	0.06 (0.35)	0.07 (0.43)	−0.06 (−0.33)	−0.04 (−0.22)	0.14 (0.84)	−0.06 (−0.33)	−0.22 (−1.36)	0.19 (1.17)	−0.13 (−0.75)	−0.01 (−0.05)	0.05 (0.28)	−0.07 (−0.41)	0.03 (0.16)	0.11 (0.68)	−0.03 (−0.20)	−0.21 (−1.24)
EMPmin	−0.31 (−1.94)	−0.50 (−3.39)	0.12 (0.70)	1.00 (−)	−0.04 (−0.24)	0.11 (0.63)	0.26 (1.56)	0.04 (0.23)	−0.20 (−1.24)	0.20 (1.19)	0.00 (0.00)	0.01 (0.07)	−0.04 (−0.24)	0.22 (1.32)	0.01 (0.07)	0.02 (0.14)	−0.30 (−1.87)	0.04 (0.26)	−0.20 (−1.18)	−0.23 (−1.38)	−0.18 (−1.06)	−0.45 (−2.99)	0.36 (2.30)	0.23 (1.43)	−0.01 (−0.07)
EMPitra	0.06 (0.38)	−0.05 (−0.32)	0.08 (0.50)	−0.04 (−0.24)	1.00 (−)	−0.13 (−0.79)	−0.01 (−0.03)	−0.03 (−0.18)	−0.10 (−0.61)	−0.06 (−0.38)	0.00 (−0.01)	0.33 (2.03)	−0.02 (−0.12)	0.14 (0.84)	0.33 (2.03)	0.18 (1.08)	0.07 (0.40)	0.25 (1.54)	−0.17 (−1.05)	−0.07 (−0.40)	−0.06 (−0.38)	−0.06 (−0.36)	0.48 (3.25)	−0.03 (−0.18)	−0.03 (−0.17)
EMPima	0.04 (0.23)	−0.25 (−1.50)	−0.15 (−0.88)	0.11 (0.63)	−0.13 (−0.79)	1.00 (−)	0.19 (1.15)	0.37 (2.34)	0.04 (0.21)	−0.10 (−0.58)	0.17 (1.04)	0.10 (0.62)	−0.01 (−0.04)	0.12 (0.69)	0.10 (0.62)	0.24 (1.47)	−0.15 (−0.88)	0.23 (1.39)	−0.10 (−0.58)	−0.06 (−0.34)	0.09 (0.55)	−0.27 (−1.67)	0.65 (5.02)	0.16 (0.96)	0.24 (1.46)
EMPco	0.28 (1.76)	−0.10 (−0.58)	−0.09 (−0.55)	0.26 (1.56)	−0.01 (−0.03)	0.19 (1.15)	1.00 (−)	0.42 (2.71)	−0.10 (−0.57)	0.17 (1.03)	0.37 (2.33)	0.16 (0.96)	0.03 (0.17)	−0.13 (−0.80)	0.16 (0.96)	−0.10 (−0.60)	−0.26 (−1.57)	0.42 (2.75)	0.49 (3.33)	0.32 (2.01)	0.20 (1.20)	−0.10 (−0.57)	0.18 (1.07)	0.95 (17.91)	0.40 (2.62)
EMPcom	0.16 (0.98)	−0.28 (−1.71)	−0.28 (−1.70)	0.04 (0.23)	−0.03 (−0.18)	0.37 (2.34)	0.42 (2.71)	1.00 (−)	0.24 (1.43)	−0.04 (−0.22)	0.48 (3.23)	0.09 (0.53)	0.17 (1.02)	0.17 (1.03)	0.09 (0.53)	−0.03 (−0.16)	−0.45 (−3.00)	0.29 (1.78)	0.35 (2.19)	−0.03 (−0.17)	0.31 (1.93)	−0.33 (−2.06)	0.13 (0.77)	0.38 (2.43)	0.82 (8.58)
EMPtra	−0.13 (−0.76)	−0.13 (−0.78)	−0.32 (−1.97)	−0.20 (−1.24)	−0.10 (−0.61)	0.04 (0.21)	−0.10 (−0.57)	0.24 (1.43)	1.00 (−)	−0.11 (−0.66)	0.30 (1.89)	0.14 (0.81)	0.24 (1.49)	0.05 (0.27)	0.14 (0.81)	0.08 (0.49)	−0.14 (−0.83)	−0.16 (−0.97)	0.03 (0.17)	0.05 (0.27)	−0.04 (−0.21)	−0.12 (−0.73)	−0.12 (−0.70)	−0.17 (−1.03)	0.52 (3.63)
EMPfin	0.23 (1.37)	0.01 (0.04)	0.06 (0.35)	0.20 (1.19)	−0.06 (−0.38)	−0.10 (−0.58)	0.17 (1.03)	−0.04 (−0.22)	−0.11 (−0.66)	1.00 (−)	−0.11 (−0.68)	−0.10 (−0.62)	−0.16 (−0.94)	−0.29 (−1.77)	−0.10 (−0.62)	−0.17 (−1.01)	−0.07 (−0.44)	0.12 (0.74)	0.40 (2.59)	0.17 (1.01)	0.14 (0.86)	0.04 (0.24)	−0.05 (−0.30)	0.25 (1.54)	0.11 (0.63)
EMPser	0.10 (0.60)	−0.13 (−0.80)	0.07 (0.43)	0.00 (0.00)	0.00 (−0.01)	0.17 (1.04)	0.37 (2.33)	0.48 (3.23)	0.30 (1.89)	−0.11 (−0.68)	1.00 (−)	0.12 (0.69)	−0.05 (−0.30)	−0.10 (−0.61)	0.12 (0.69)	−0.15 (−0.89)	−0.19 (−1.15)	0.02 (0.15)	0.24 (1.49)	−0.08 (−0.45)	0.26 (1.61)	−0.09 (−0.54)	0.05 (0.27)	0.38 (2.45)	0.79 (7.53)
IPIg	0.29 (1.94)	−0.03 (−0.19)	−0.06 (−0.33)	0.01 (0.07)	0.33 (2.03)	0.10 (0.62)	0.16 (0.96)	0.09 (0.53)	0.14 (0.81)	−0.10 (−0.62)	0.12 (0.69)	1.00 (−)	0.01 (0.09)	0.32 (2.18)	1.00 (−)	0.19 (1.27)	−0.05 (−0.33)	0.37 (2.52)	0.19 (1.22)	0.03 (0.18)	0.26 (1.75)	−0.05 (−0.29)	0.29 (1.77)	0.05 (0.28)	0.13 (0.78)
IPIen	0.02 (0.14)	−0.06 (−0.34)	−0.04 (−0.22)	−0.04 (−0.24)	−0.02 (−0.12)	−0.01 (−0.04)	0.03 (0.17)	0.17 (1.02)	0.24 (1.49)	−0.16 (−0.94)	−0.05 (−0.30)	0.01 (0.09)	1.00 (−)	0.25 (1.65)	0.01 (0.09)	0.41 (2.89)	0.04 (0.27)	−0.01 (−0.04)	−0.07 (−0.44)	0.12 (0.80)	0.04 (0.24)	−0.02 (−0.11)	0.06 (0.34)	−0.07 (−0.41)	0.11 (0.67)
IPIex	−0.02 (−0.13)	−0.28 (−1.72)	0.14 (0.84)	0.22 (1.32)	0.14 (0.84)	0.12 (0.69)	−0.13 (−0.80)	0.17 (1.03)	0.05 (0.27)	−0.29 (−1.77)	−0.10 (−0.61)	0.32 (2.18)	0.25 (1.65)	1.00 (−)	0.32 (2.18)	0.34 (2.29)	−0.05 (−0.29)	0.11 (0.70)	−0.30 (−1.99)	−0.01 (−0.08)	0.11 (0.69)	−0.32 (−1.97)	0.21 (1.27)	−0.21 (−1.28)	0.00 (0.02)
IPItr	0.29 (1.94)	−0.03 (−0.19)	−0.06 (−0.33)	0.01 (0.07)	0.33 (2.03)	0.10 (0.62)	0.16 (0.96)	0.09 (0.53)	0.14 (0.81)	−0.10 (−0.62)	0.12 (0.69)	1.00 (−)	0.01 (0.09)	0.32 (2.18)	1.00 (−)	0.19 (1.27)	−0.05 (−0.33)	0.37 (2.52)	0.19 (1.22)	0.03 (0.18)	0.26 (1.75)	−0.05 (−0.29)	0.29 (1.77)	0.05 (0.28)	0.13 (0.78)
IPIot	0.02 (0.15)	0.08 (0.49)	−0.22 (−1.36)	0.02 (0.14)	0.18 (1.08)	0.24 (1.47)	−0.10 (−0.60)	−0.03 (−0.16)	0.08 (0.49)	−0.17 (−1.01)	−0.15 (−0.89)	0.19 (1.27)	0.41 (2.89)	0.34 (2.29)	0.19 (1.27)	1.00 (−)	−0.01 (−0.09)	0.08 (0.49)	−0.17 (−1.07)	0.14 (0.93)	0.09 (0.55)	0.05 (0.31)	0.37 (2.38)	−0.21 (−1.25)	−0.06 (−0.36)
GVAag	0.33 (2.73)	0.33 (2.06)	0.19 (1.17)	−0.30 (−1.87)	0.07 (0.40)	−0.15 (−0.88)	−0.26 (−1.57)	−0.45 (−3.00)	−0.14 (−0.83)	−0.07 (−0.44)	−0.19 (−1.15)	−0.05 (−0.33)	0.04 (0.27)	−0.05 (−0.29)	−0.05 (−0.33)	−0.01 (−0.09)	1.00 (−)	0.11 (0.85)	−0.13 (−1.06)	0.26 (2.09)	0.18 (1.40)	0.34 (2.17)	−0.12 (−0.71)	−0.20 (−1.21)	−0.38 (−2.46)
GVAin	0.91 (16.98)	0.03 (0.17)	−0.13 (−0.75)	0.04 (0.26)	0.25 (1.54)	0.23 (1.39)	0.42 (2.75)	0.29 (1.78)	−0.16 (−0.97)	0.12 (0.74)	0.02 (0.15)	0.37 (2.52)	−0.01 (−0.04)	0.11 (0.70)	0.37 (2.52)	0.08 (0.49)	0.11 (0.85)	1.00 (−)	0.72 (8.07)	0.34 (2.82)	0.71 (7.80)	0.01 (0.06)	0.23 (1.43)	0.42 (2.72)	0.16 (0.95)
GVAco	0.74 (8.69)	0.20 (1.19)	−0.01 (−0.05)	−0.20 (−1.18)	−0.17 (−1.05)	−0.10 (−0.58)	0.49 (3.33)	0.35 (2.19)	0.03 (0.17)	0.40 (2.59)	0.24 (1.49)	0.19 (1.22)	−0.07 (−0.44)	−0.30 (−1.99)	0.19 (1.22)	−0.17 (−1.07)	−0.13 (−1.06)	0.72 (8.07)	1.00 (−)	0.32 (2.59)	0.60 (5.88)	0.17 (1.03)	−0.26 (−1.60)	0.48 (3.27)	0.41 (2.62)
GVAsnv	0.51 (4.65)	0.18 (1.10)	0.05 (0.28)	−0.23 (−1.38)	−0.07 (−0.40)	−0.06 (−0.34)	0.32 (2.01)	−0.03 (−0.17)	0.05 (0.27)	0.17 (1.01)	−0.08 (−0.45)	0.03 (0.18)	0.12 (0.80)	−0.01 (−0.08)	0.03 (0.18)	0.14 (0.93)	0.26 (2.09)	0.34 (2.82)	0.32 (2.59)	1.00 (−)	0.44 (3.78)	0.19 (1.14)	−0.17 (−1.03)	0.35 (2.21)	0.00 (0.00)
GVAsv	0.87 (13.87)	−0.05 (−0.27)	−0.07 (−0.41)	−0.18 (−1.06)	−0.06 (−0.38)	0.09 (0.55)	0.20 (1.20)	0.31 (1.93)	−0.04 (−0.21)	0.14 (0.86)	0.26 (1.61)	0.26 (1.75)	0.04 (0.24)	0.11 (0.69)	0.26 (1.75)	0.09 (0.55)	0.18 (1.40)	0.71 (7.80)	0.60 (5.88)	0.44 (3.78)	1.00 (−)	−0.08 (−0.47)	−0.09 (−0.53)	0.18 (1.09)	0.33 (2.08)
EMPa	0.17 (1.00)	0.98 (28.75)	0.03 (0.16)	−0.45 (−2.99)	−0.06 (−0.36)	−0.27 (−1.67)	−0.10 (−0.57)	−0.33 (−2.06)	−0.12 (−0.73)	0.04 (0.24)	−0.09 (−0.54)	−0.05 (−0.29)	−0.02 (−0.11)	−0.32 (−1.97)	−0.05 (−0.29)	0.05 (0.31)	0.34 (2.17)	0.01 (0.06)	0.17 (1.03)	0.19 (1.14)	−0.08 (−0.47)	1.00 (−)	−0.25 (−1.50)	−0.13 (−0.78)	−0.22 (−1.31)
EMPin	−0.11 (−0.65)	−0.24 (−1.46)	0.11 (0.68)	0.36 (2.30)	0.48 (3.25)	0.65 (5.02)	0.18 (1.07)	0.13 (0.77)	−0.12 (−0.70)	−0.05 (−0.30)	0.05 (0.27)	0.29 (1.77)	0.06 (0.34)	0.21 (1.27)	0.29 (1.77)	0.37 (2.38)	−0.12 (−0.71)	0.23 (1.43)	−0.26 (−1.60)	−0.17 (−1.03)	−0.09 (−0.53)	−0.25 (−1.50)	1.00 (−)	0.09 (0.52)	0.05 (0.30)
EMPc	0.32 (1.97)	−0.15 (−0.87)	−0.03 (−0.20)	0.23 (1.43)	−0.03 (−0.18)	0.16 (0.96)	0.95 (17.91)	0.38 (2.43)	−0.17 (−1.03)	0.25 (1.54)	0.38 (2.45)	0.05 (0.28)	−0.07 (−0.41)	−0.21 (−1.28)	0.05 (0.28)	−0.21 (−1.25)	−0.20 (−1.21)	0.42 (2.72)	0.48 (3.27)	0.35 (2.21)	0.18 (1.09)	−0.13 (−0.78)	0.09 (0.52)	1.00 (−)	0.37 (2.37)
EMPs	0.16 (0.98)	−0.21 (−1.27)	−0.21 (−1.24)	−0.01 (−0.07)	−0.03 (−0.17)	0.24 (1.46)	0.40 (2.62)	0.82 (8.58)	0.52 (3.63)	0.11 (0.63)	0.79 (7.53)	0.13 (0.78)	0.11 (0.67)	0.00 (0.02)	0.13 (0.78)	−0.06 (−0.36)	−0.38 (−2.46)	0.16 (0.95)	0.41 (2.62)	0.00 (0.00)	0.33 (2.08)	−0.22 (−1.31)	0.05 (0.30)	0.37 (2.37)	1.00 (−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

Table 33: Correlations of sectoral employment and output. Hodrick-Prescott Filter. 1970.1-1985.4

	GDP	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	GVAag	GVAin	GVAco	GVAsnv	GVAsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00 (−)	−0.06 (−0.35)	0.04 (0.21)	0.19 (1.13)	0.47 (3.23)	0.46 (3.15)	0.71 (5.99)	0.51 (3.58)	−0.04 (−0.24)	0.65 (5.16)	0.51 (3.59)	0.61 (5.04)	−0.07 (−0.43)	−0.01 (−0.05)	0.61 (5.04)	0.24 (1.60)	0.15 (1.23)	0.93 (19.92)	0.79 (10.01)	0.38 (3.19)	0.86 (13.18)	−0.08 (−0.45)	0.44 (2.98)	0.70 (5.82)	0.51 (3.57)
EMPag	−0.06 (−0.35)	1.00 (−)	0.31 (1.92)	−0.40 (−2.60)	−0.33 (−2.08)	−0.43 (−2.87)	−0.30 (−1.87)	−0.66 (−5.23)	−0.58 (−4.27)	−0.26 (−1.59)	−0.13 (−0.77)	−0.40 (−2.59)	−0.07 (−0.44)	−0.07 (−0.44)	−0.40 (−2.59)	0.14 (0.82)	0.49 (3.34)	−0.24 (−1.48)	−0.31 (−1.97)	−0.08 (−0.50)	−0.02 (−0.12)	1.00 (60.52)	−0.44 (−2.94)	−0.31 (−1.93)	−0.56 (−4.05)
EMPen	0.04 (0.21)	0.31 (1.92)	1.00 (−)	−0.20 (−1.23)	−0.02 (−0.12)	−0.48 (−3.32)	−0.18 (−1.11)	−0.46 (−3.08)	−0.54 (−3.86)	−0.06 (−0.38)	−0.16 (−0.94)	0.05 (0.28)	−0.05 (−0.32)	−0.06 (−0.35)	0.05 (0.28)	−0.33 (−2.08)	0.25 (1.57)	−0.14 (−0.87)	−0.06 (−0.37)	−0.05 (−0.27)	0.09 (0.57)	0.32 (2.03)	−0.29 (−1.81)	−0.18 (−1.08)	−0.44 (−2.92)
EMPmin	0.19 (1.13)	−0.40 (−2.60)	−0.20 (−1.23)	1.00 (−)	0.33 (2.11)	0.63 (4.85)	0.59 (4.39)	0.56 (4.07)	−0.06 (−0.37)	0.28 (1.78)	0.52 (3.69)	0.31 (1.94)	−0.24 (−1.51)	0.11 (0.69)	0.31 (1.94)	0.15 (0.94)	−0.37 (−2.38)	0.46 (3.11)	0.26 (1.59)	−0.07 (−0.43)	0.14 (0.83)	−0.37 (−2.42)	0.72 (6.30)	0.60 (4.50)	0.52 (3.66)
EMPitra	0.47 (3.23)	−0.33 (−2.08)	−0.02 (−0.12)	0.33 (2.11)	1.00 (−)	0.49 (3.39)	0.38 (2.48)	0.40 (2.58)	0.12 (0.70)	0.16 (0.97)	0.23 (1.43)	0.57 (4.21)	−0.11 (−0.69)	0.19 (1.13)	0.57 (4.21)	0.21 (1.30)	0.12 (0.70)	0.57 (4.16)	0.06 (0.38)	0.20 (1.20)	0.15 (0.91)	−0.33 (−2.11)	0.77 (7.29)	0.37 (2.42)	0.35 (2.22)
EMPima	0.46 (3.15)	−0.43 (−2.87)	−0.48 (−3.32)	0.63 (4.85)	0.49 (3.39)	1.00 (−)	0.58 (4.24)	0.76 (7.04)	0.23 (1.44)	0.34 (2.17)	0.46 (3.07)	0.46 (3.07)	−0.08 (−0.51)	0.28 (1.72)	0.46 (3.07)	0.55 (3.92)	−0.20 (−1.23)	0.72 (6.28)	0.12 (0.70)	0.41 (2.73)	0.22 (1.37)	−0.43 (−2.89)	0.88 (11.18)	0.58 (4.22)	0.66 (5.33)
EMPco	0.71 (5.99)	−0.30 (−1.87)	−0.18 (−1.11)	0.59 (4.39)	0.38 (2.48)	0.58 (4.24)	1.00 (−)	0.81 (8.40)	0.16 (0.95)	0.80 (8.03)	0.82 (8.67)	0.57 (4.12)	−0.10 (−0.58)	−0.27 (−1.71)	0.57 (4.12)	0.21 (1.30)	−0.52 (−3.68)	0.55 (3.99)	0.78 (7.51)	0.56 (4.03)	0.58 (4.25)	−0.30 (−1.91)	0.59 (4.40)	1.00 (64.48)	0.85 (9.82)
EMPcom	0.51 (3.58)	−0.66 (−5.23)	−0.46 (−3.08)	0.56 (4.07)	0.40 (2.58)	0.76 (7.04)	0.81 (8.40)	1.00 (−)	0.48 (3.28)	0.67 (5.42)	0.65 (5.14)	0.54 (3.84)	0.04 (0.25)	−0.02 (−0.12)	0.54 (3.84)	0.27 (1.66)	−0.62 (−4.74)	0.57 (4.16)	0.64 (4.99)	0.51 (3.55)	0.38 (2.44)	−0.67 (−5.44)	0.67 (5.43)	0.81 (8.26)	0.95 (18.64)
EMPtra	−0.04 (−0.24)	−0.58 (−4.27)	−0.54 (−3.86)	−0.06 (−0.37)	0.12 (0.70)	0.23 (1.44)	0.16 (0.95)	0.48 (3.28)	1.00 (−)	0.27 (1.68)	0.15 (0.94)	0.03 (0.16)	0.40 (2.62)	−0.06 (−0.33)	0.03 (0.16)	0.07 (0.44)	−0.27 (−1.66)	−0.01 (−0.07)	0.33 (2.08)	0.19 (1.18)	−0.22 (−1.38)	−0.59 (−4.37)	0.15 (0.89)	0.15 (0.91)	0.56 (4.04)
EMPfin	0.65 (5.16)	−0.26 (−1.59)	−0.06 (−0.38)	0.28 (1.78)	0.16 (0.97)	0.34 (2.17)	0.80 (8.03)	0.67 (5.42)	0.27 (1.68)	1.00 (−)	0.65 (5.15)	0.42 (2.74)	0.04 (0.25)	−0.33 (−2.11)	0.42 (2.74)	0.16 (0.98)	−0.51 (−3.60)	0.36 (2.34)	0.79 (7.62)	0.67 (5.46)	0.58 (4.24)	−0.26 (−1.64)	0.27 (1.70)	0.80 (8.08)	0.75 (6.82)
EMPser	0.51 (3.59)	−0.13 (−0.77)	−0.16 (−0.94)	0.52 (3.69)	0.23 (1.43)	0.46 (3.07)	0.82 (8.67)	0.65 (5.14)	0.15 (0.94)	0.65 (5.15)	1.00 (−)	0.24 (1.51)	−0.01 (−0.04)	−0.19 (−1.17)	0.24 (1.51)	0.30 (1.90)	−0.44 (−2.98)	0.28 (1.78)	0.62 (4.76)	0.31 (1.94)	0.53 (3.73)	−0.12 (−0.75)	0.43 (2.88)	0.82 (8.66)	0.80 (7.87)
IPIg	0.61 (5.04)	−0.40 (−2.59)	0.05 (0.28)	0.31 (1.94)	0.57 (4.21)	0.46 (3.07)	0.57 (4.12)	0.54 (3.84)	0.03 (0.16)	0.42 (2.74)	0.24 (1.51)	1.00 (−)	−0.08 (−0.51)	0.29 (1.93)	1.00 (−)	0.07 (0.43)	−0.22 (−1.46)	0.73 (6.95)	0.23 (1.54)	0.37 (2.55)	0.41 (2.91)	−0.41 (−2.67)	0.54 (3.89)	0.54 (3.90)	0.43 (2.90)
IPIen	−0.07 (−0.43)	−0.07 (−0.44)	−0.05 (−0.32)	−0.24 (−1.51)	−0.11 (−0.69)	−0.08 (−0.51)	−0.10 (−0.58)	0.04 (0.25)	0.40 (2.62)	0.04 (0.25)	−0.01 (−0.04)	−0.08 (−0.51)	1.00 (−)	0.25 (1.67)	−0.08 (−0.51)	0.38 (2.66)	0.08 (0.53)	−0.09 (−0.61)	−0.03 (−0.17)	0.08 (0.55)	−0.14 (−0.94)	−0.08 (−0.46)	−0.18 (−1.12)	−0.12 (−0.75)	0.09 (0.55)
IPIex	−0.01 (−0.05)	−0.07 (−0.44)	−0.06 (−0.35)	0.11 (0.69)	0.19 (1.13)	0.28 (1.72)	−0.27 (−1.71)	−0.02 (−0.12)	−0.06 (−0.33)	−0.33 (−2.11)	−0.19 (−1.17)	0.29 (1.93)	0.25 (1.67)	1.00 (−)	0.29 (1.93)	0.43 (3.04)	0.22 (1.48)	0.37 (2.59)	−0.58 (−4.65)	−0.12 (−0.79)	−0.07 (−0.46)	−0.07 (−0.45)	0.21 (1.30)	−0.29 (−1.84)	−0.13 (−0.78)
IPItr	0.61 (5.04)	−0.40 (−2.59)	0.05 (0.28)	0.31 (1.94)	0.57 (4.21)	0.46 (3.07)	0.57 (4.12)	0.54 (3.84)	0.03 (0.16)	0.42 (2.74)	0.24 (1.51)	1.00 (−)	−0.08 (−0.51)	0.29 (1.93)	1.00 (−)	0.07 (0.43)	−0.22 (−1.46)	0.73 (6.95)	0.23 (1.54)	0.37 (2.55)	0.41 (2.91)	−0.41 (−2.67)	0.54 (3.89)	0.54 (3.90)	0.43 (2.90)
IPIot	0.24 (1.60)	0.14 (0.82)	−0.33 (−2.08)	0.15 (0.94)	0.21 (1.30)	0.55 (3.92)	0.21 (1.30)	0.27 (1.66)	0.07 (0.44)	0.16 (0.98)	0.30 (1.90)	0.07 (0.43)	0.38 (2.66)	0.43 (3.04)	0.07 (0.43)	1.00 (−)	0.11 (0.73)	0.25 (1.66)	−0.20 (−1.30)	0.35 (2.42)	0.20 (1.31)	0.12 (0.73)	0.38 (2.44)	0.18 (1.09)	0.27 (1.68)
GVAag	0.15 (1.23)	0.49 (3.34)	0.25 (1.57)	−0.37 (−2.38)	0.12 (0.70)	−0.20 (−1.23)	−0.52 (−3.68)	−0.62 (−4.74)	−0.27 (−1.66)	−0.51 (−3.60)	−0.44 (−2.98)	−0.22 (−1.46)	0.08 (0.53)	0.22 (1.48)	−0.22 (−1.46)	0.11 (0.73)	1.00 (−)	0.07 (0.57)	−0.31 (−2.57)	0.07 (0.54)	−0.02 (−0.13)	0.49 (3.41)	−0.12 (−0.72)	−0.52 (−3.63)	−0.61 (−4.62)
GVAin	0.93 (19.92)	−0.24 (−1.48)	−0.14 (−0.87)	0.46 (3.11)	0.57 (4.16)	0.72 (6.28)	0.55 (3.99)	0.57 (4.16)	−0.01 (−0.07)	0.36 (2.34)	0.28 (1.78)	0.73 (6.95)	−0.09 (−0.61)	0.37 (2.59)	0.73 (6.95)	0.25 (1.66)	0.07 (0.57)	1.00 (−)	0.68 (7.35)	0.22 (1.80)	0.70 (7.68)	−0.24 (−1.46)	0.73 (6.40)	0.56 (4.03)	0.46 (3.14)
GVAco	0.79 (10.01)	−0.31 (−1.97)	−0.06 (−0.37)	0.26 (1.59)	0.06 (0.38)	0.12 (0.70)	0.78 (7.51)	0.64 (4.99)	0.33 (2.08)	0.79 (7.62)	0.62 (4.76)	0.23 (1.54)	−0.03 (−0.17)	−0.58 (−4.65)	0.23 (1.54)	−0.20 (−1.30)	−0.31 (−2.57)	0.68 (7.35)	1.00 (−)	0.43 (3.70)	0.70 (7.81)	−0.33 (−2.08)	0.14 (0.84)	0.78 (7.48)	0.72 (6.31)
GVAsnv	0.38 (3.19)	−0.08 (−0.50)	−0.05 (−0.27)	−0.07 (−0.43)	0.20 (1.20)	0.41 (2.73)	0.56 (4.03)	0.51 (3.55)	0.19 (1.18)	0.67 (5.46)	0.31 (1.94)	0.37 (2.55)	0.08 (0.55)	−0.12 (−0.79)	0.37 (2.55)	0.35 (2.42)	0.07 (0.54)	0.22 (1.80)	0.43 (3.70)	1.00 (−)	0.48 (4.30)	−0.10 (−0.59)	0.23 (1.44)	0.55 (3.91)	0.49 (3.34)
GVAsv	0.86 (13.18)	−0.02 (−0.12)	0.09 (0.57)	0.14 (0.83)	0.15 (0.91)	0.22 (1.37)	0.58 (4.25)	0.38 (2.44)	−0.22 (−1.38)	0.58 (4.24)	0.53 (3.73)	0.41 (2.91)	−0.14 (−0.94)	−0.07 (−0.46)	0.41 (2.91)	0.20 (1.31)	−0.02 (−0.13)	0.70 (7.68)	0.70 (7.81)	0.48 (4.30)	1.00 (−)	−0.04 (−0.23)	0.14 (0.84)	0.55 (4.00)	0.38 (2.47)
EMPa	−0.08 (−0.45)	1.00 (60.52)	0.32 (2.03)	−0.37 (−2.42)	−0.33 (−2.11)	−0.43 (−2.89)	−0.30 (−1.91)	−0.67 (−5.44)	−0.59 (−4.37)	−0.26 (−1.64)	−0.12 (−0.75)	−0.41 (−2.67)	−0.08 (−0.46)	−0.07 (−0.45)	−0.41 (−2.67)	0.12 (0.73)	0.49 (3.41)	−0.24 (−1.46)	−0.33 (−2.08)	−0.10 (−0.59)	−0.04 (−0.23)	1.00 (−)	−0.43 (−2.89)	−0.31 (−1.94)	−0.57 (−4.15)
EMPin	0.44 (2.98)	−0.44 (−2.94)	−0.29 (−1.81)	0.72 (6.30)	0.77 (7.29)	0.88 (11.18)	0.59 (4.40)	0.67 (5.43)	0.15 (0.89)	0.27 (1.70)	0.43 (2.88)	0.54 (3.89)	−0.18 (−1.12)	0.21 (1.30)	0.54 (3.89)	0.38 (2.44)	−0.12 (−0.72)	0.73 (6.40)	0.14 (0.84)	0.23 (1.44)	0.14 (0.84)	−0.43 (−2.89)	1.00 (−)	0.59 (4.38)	0.59 (4.42)
EMPc	0.70 (5.82)	−0.31 (−1.93)	−0.18 (−1.08)	0.60 (4.50)	0.37 (2.42)	0.58 (4.22)	1.00 (64.48)	0.81 (8.26)	0.15 (0.91)	0.80 (8.08)	0.82 (8.66)	0.54 (3.90)	−0.12 (−0.75)	−0.29 (−1.84)	0.54 (3.90)	0.18 (1.09)	−0.52 (−3.63)	0.56 (4.03)	0.78 (7.48)	0.55 (3.91)	0.55 (4.00)	−0.31 (−1.94)	0.59 (4.38)	1.00 (−)	0.85 (9.66)
EMPs	0.51 (3.57)	−0.56 (−4.05)	−0.44 (−2.92)	0.52 (3.66)	0.35 (2.22)	0.66 (5.33)	0.85 (9.82)	0.95 (18.64)	0.56 (4.04)	0.75 (6.82)	0.80 (7.87)	0.43 (2.90)	0.09 (0.55)	−0.13 (−0.78)	0.43 (2.90)	0.27 (1.68)	−0.61 (−4.62)	0.46 (3.14)	0.72 (6.31)	0.49 (3.34)	0.38 (2.47)	−0.57 (−4.15)	0.59 (4.42)	0.85 (9.66)	1.00 (−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

Table 34: Correlaciones de empleo y producci'on sectorial. Filtro Baxter-King. 1970.1-1985.4

	GDP	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	GVAag	GVAin	GVAco	GVAsnv	GVAsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00 (−)	−0.17 (−1.02)	−0.01 (−0.09)	0.36 (2.31)	0.58 (4.24)	0.61 (4.60)	0.73 (6.44)	0.58 (4.23)	−0.05 (−0.27)	0.68 (5.55)	0.53 (3.72)	0.78 (8.08)	−0.06 (−0.39)	0.17 (1.10)	0.74 (7.06)	0.42 (2.98)	0.16 (1.30)	0.93 (19.65)	0.78 (9.73)	0.42 (3.65)	0.88 (14.25)	−0.18 (−1.12)	0.58 (4.33)	0.72 (6.15)	0.54 (3.86)
EMPag	−0.17 (−1.02)	1.00 (−)	0.41 (2.67)	−0.38 (−2.49)	−0.37 (−2.36)	−0.46 (−3.11)	−0.36 (−2.28)	−0.71 (−6.08)	−0.61 (−4.63)	−0.36 (−2.29)	−0.17 (−1.06)	−0.27 (−1.66)	−0.11 (−0.63)	−0.02 (−0.11)	−0.47 (−3.20)	0.08 (0.50)	0.51 (3.55)	−0.29 (−1.81)	−0.37 (−2.39)	−0.15 (−0.88)	−0.18 (−1.08)	1.00 (153.70)	−0.45 (−2.98)	−0.35 (−2.26)	−0.60 (−4.53
EMPen	−0.01 (−0.09)	0.41 (2.67)	1.00 (−)	−0.41 (−2.73)	−0.05 (−0.28)	−0.60 (−4.47)	−0.29 (−1.84)	−0.55 (−3.91)	−0.58 (−4.29)	−0.20 (−1.21)	−0.32 (−2.05)	−0.22 (−1.33)	−0.08 (−0.48)	−0.19 (−1.17)	0.12 (0.75)	−0.47 (−3.17)	0.29 (1.83)	−0.10 (−0.63)	−0.11 (−0.68)	−0.12 (−0.74)	−0.01 (−0.07)	0.41 (2.68)	−0.37 (−2.42)	−0.30 (−1.85)	−0.55 (−3.91
EMPmin	0.36 (2.31)	−0.38 (−2.49)	−0.41 (−2.73)	1.00 (−)	0.44 (2.96)	0.77 (7.24)	0.68 (5.50)	0.68 (5.54)	−0.12 (−0.73)	0.35 (2.25)	0.66 (5.24)	0.43 (2.89)	−0.38 (−2.45)	0.15 (0.91)	0.41 (2.69)	0.36 (2.34)	−0.37 (−2.37)	0.56 (4.04)	0.33 (2.08)	0.02 (0.12)	0.33 (2.10)	−0.37 (−2.42)	0.82 (8.67)	0.69 (5.69)	0.62 (4.73)
EMPitra	0.58 (4.24)	−0.37 (−2.36)	−0.05 (−0.28)	0.44 (2.96)	1.00 (−)	0.55 (3.99)	0.42 (2.77)	0.39 (2.52)	0.08 (0.49)	0.22 (1.33)	0.25 (1.57)	0.62 (4.77)	−0.15 (−0.92)	0.31 (1.97)	0.63 (4.85)	0.30 (1.87)	0.18 (1.11)	0.62 (4.69)	0.10 (0.60)	0.23 (1.44)	0.30 (1.90)	−0.37 (−2.39)	0.82 (8.59)	0.41 (2.73)	0.33 (2.09)
EMPima	0.61 (4.60)	−0.46 (−3.11)	−0.60 (−4.47)	0.77 (7.24)	0.55 (3.99)	1.00 (−)	0.64 (4.99)	0.78 (7.59)	0.20 (1.26)	0.44 (2.94)	0.54 (3.84)	0.78 (7.55)	−0.09 (−0.56)	0.46 (3.07)	0.48 (3.28)	0.71 (6.00)	−0.19 (−1.17)	0.78 (7.44)	0.24 (1.50)	0.47 (3.21)	0.42 (2.78)	−0.47 (−3.15)	0.89 (11.55)	0.63 (4.93)	0.69 (5.75)
EMPco	0.73 (6.44)	−0.36 (−2.28)	−0.29 (−1.84)	0.68 (5.50)	0.42 (2.77)	0.64 (4.99)	1.00 (−)	0.85 (9.84)	0.11 (0.69)	0.90 (12.16)	0.86 (10.27)	0.57 (4.12)	−0.15 (−0.93)	−0.24 (−1.49)	0.66 (5.26)	0.38 (2.46)	−0.49 (−3.36)	0.63 (4.92)	0.84 (9.30)	0.53 (3.78)	0.67 (5.45)	−0.36 (−2.32)	0.62 (4.73)	1.00 (152.18)	0.88 (11.20
EMPcom	0.58 (4.23)	−0.71 (−6.08)	−0.55 (−3.91)	0.68 (5.54)	0.39 (2.52)	0.78 (7.59)	0.85 (9.84)	1.00 (−)	0.43 (2.90)	0.80 (8.03)	0.71 (6.06)	0.60 (4.51)	0.03 (0.19)	−0.02 (−0.09)	0.59 (4.43)	0.40 (2.60)	−0.61 (−4.65)	0.62 (4.72)	0.73 (6.32)	0.50 (3.43)	0.53 (3.76)	−0.72 (−6.20)	0.66 (5.29)	0.85 (9.64)	0.96 (19.50
EMPtra	−0.05 (−0.27)	−0.61 (−4.63)	−0.58 (−4.29)	−0.12 (−0.73)	0.08 (0.49)	0.20 (1.26)	0.11 (0.69)	0.43 (2.90)	1.00 (−)	0.31 (1.96)	0.11 (0.65)	0.11 (0.64)	0.56 (4.09)	−0.03 (−0.21)	−0.05 (−0.27)	0.13 (0.79)	−0.22 (−1.35)	−0.03 (−0.21)	0.24 (1.45)	0.21 (1.30)	−0.17 (−1.03)	−0.62 (−4.71)	0.07 (0.41)	0.11 (0.65)	0.50 (3.48)
EMPfin	0.68 (5.55)	−0.36 (−2.29)	−0.20 (−1.21)	0.35 (2.25)	0.22 (1.33)	0.44 (2.94)	0.90 (12.16)	0.80 (8.03)	0.31 (1.96)	1.00 (−)	0.81 (8.14)	0.50 (3.48)	0.11 (0.69)	−0.35 (−2.23)	0.57 (4.14)	0.33 (2.11)	−0.55 (−3.99)	0.49 (3.33)	0.91 (13.27)	0.62 (4.72)	0.67 (5.48)	−0.37 (−2.38)	0.33 (2.09)	0.89 (11.57)	0.88 (10.85
EMPser	0.53 (3.72)	−0.17 (−1.06)	−0.32 (−2.05)	0.66 (5.24)	0.25 (1.57)	0.54 (3.84)	0.86 (10.27)	0.71 (6.06)	0.11 (0.65)	0.81 (8.14)	1.00 (−)	0.45 (3.00)	−0.01 (−0.04)	−0.18 (−1.12)	0.30 (1.90)	0.52 (3.62)	−0.44 (−2.93)	0.37 (2.42)	0.68 (5.58)	0.23 (1.41)	0.58 (4.26)	−0.18 (−1.09)	0.49 (3.39)	0.86 (10.28)	0.84 (9.22)
IPIg	0.78 (8.08)	−0.27 (−1.66)	−0.22 (−1.33)	0.43 (2.89)	0.62 (4.77)	0.78 (7.55)	0.57 (4.12)	0.60 (4.51)	0.11 (0.64)	0.50 (3.48)	0.45 (3.00)	1.00 (−)	0.18 (1.15)	0.64 (5.36)	0.67 (5.87)	0.69 (6.14)	0.01 (0.06)	0.84 (10.19)	0.12 (0.77)	0.58 (4.60)	0.54 (4.14)	−0.28 (−1.77)	0.70 (5.94)	0.55 (3.93)	0.53 (3.77)
IPIen	−0.06 (−0.39)	−0.11 (−0.63)	−0.08 (−0.48)	−0.38 (−2.45)	−0.15 (−0.92)	−0.09 (−0.56)	−0.15 (−0.93)	0.03 (0.19)	0.56 (4.09)	0.11 (0.69)	−0.01 (−0.04)	0.18 (1.15)	1.00 (−)	0.14 (0.94)	−0.26 (−1.72)	0.33 (2.27)	0.16 (1.07)	−0.17 (−1.11)	0.02 (0.11)	0.14 (0.93)	−0.21 (−1.38)	−0.12 (−0.75)	−0.26 (−1.61)	−0.17 (−1.05)	0.12 (0.72)
IPIex	0.17 (1.10)	−0.02 (−0.11)	−0.19 (−1.17)	0.15 (0.91)	0.31 (1.97)	0.46 (3.07)	−0.24 (−1.49)	−0.02 (−0.09)	−0.03 (−0.21)	−0.35 (−2.23)	−0.18 (−1.12)	0.64 (5.36)	0.14 (0.94)	1.00 (−)	0.21 (1.43)	0.48 (3.58)	0.32 (2.23)	0.47 (3.50)	−0.62 (−5.17)	0.05 (0.31)	−0.03 (−0.16)	−0.03 (−0.15)	0.39 (2.51)	−0.25 (−1.57)	−0.13 (−0.81
IPItr	0.74 (7.06)	−0.47 (−3.20)	0.12 (0.75)	0.41 (2.69)	0.63 (4.85)	0.48 (3.28)	0.66 (5.26)	0.59 (4.43)	−0.05 (−0.27)	0.57 (4.14)	0.30 (1.90)	0.67 (5.87)	−0.26 (−1.72)	0.21 (1.43)	1.00 (−)	−0.03 (−0.17)	−0.25 (−1.67)	0.84 (9.86)	0.39 (2.71)	0.47 (3.45)	0.56 (4.42)	−0.47 (−3.21)	0.59 (4.39)	0.65 (5.19)	0.47 (3.23)
IPIot	0.42 (2.98)	0.08 (0.50)	−0.47 (−3.17)	0.36 (2.34)	0.30 (1.87)	0.71 (6.00)	0.38 (2.46)	0.40 (2.60)	0.13 (0.79)	0.33 (2.11)	0.52 (3.62)	0.69 (6.14)	0.33 (2.27)	0.48 (3.58)	−0.03 (−0.17)	1.00 (−)	0.13 (0.87)	0.36 (2.50)	−0.04 (−0.28)	0.41 (2.94)	0.30 (2.02)	0.07 (0.39)	0.51 (3.52)	0.36 (2.35)	0.43 (2.88)
GVAag	0.16 (1.30)	0.51 (3.55)	0.29 (1.83)	−0.37 (−2.37)	0.18 (1.11)	−0.19 (−1.17)	−0.49 (−3.36)	−0.61 (−4.65)	−0.22 (−1.35)	−0.55 (−3.99)	−0.44 (−2.93)	0.01 (0.06)	0.16 (1.07)	0.32 (2.23)	−0.25 (−1.67)	0.13 (0.87)	1.00 (−)	0.04 (0.34)	−0.32 (−2.63)	0.11 (0.88)	−0.03 (−0.24)	0.51 (3.52)	−0.06 (−0.37)	−0.49 (−3.39)	−0.59 (−4.40
GVAin	0.93 (19.65)	−0.29 (−1.81)	−0.10 (−0.63)	0.56 (4.04)	0.62 (4.69)	0.78 (7.44)	0.63 (4.92)	0.62 (4.72)	−0.03 (−0.21)	0.49 (3.33)	0.37 (2.42)	0.84 (10.19)	−0.17 (−1.11)	0.47 (3.50)	0.84 (9.86)	0.36 (2.50)	0.04 (0.34)	1.00 (−)	0.72 (8.23)	0.31 (2.59)	0.74 (8.77)	−0.29 (−1.82)	0.78 (7.49)	0.63 (4.88)	0.51 (3.52)
GVAco	0.78 (9.73)	−0.37 (−2.39)	−0.11 (−0.68)	0.33 (2.08)	0.10 (0.60)	0.24 (1.50)	0.84 (9.30)	0.73 (6.32)	0.24 (1.45)	0.91 (13.27)	0.68 (5.58)	0.12 (0.77)	0.02 (0.11)	−0.62 (−5.17)	0.39 (2.71)	−0.04 (−0.28)	−0.32 (−2.63)	0.72 (8.23)	1.00 (−)	0.41 (3.49)	0.74 (8.63)	−0.38 (−2.43)	0.19 (1.18)	0.84 (9.23)	0.78 (7.39)
GVAsnv	0.42 (3.65)	−0.15 (−0.88)	−0.12 (−0.74)	0.02 (0.12)	0.23 (1.44)	0.47 (3.21)	0.53 (3.78)	0.50 (3.43)	0.21 (1.30)	0.62 (4.72)	0.23 (1.41)	0.58 (4.60)	0.14 (0.93)	0.05 (0.31)	0.47 (3.45)	0.41 (2.94)	0.11 (0.88)	0.31 (2.59)	0.41 (3.49)	1.00 (−)	0.46 (4.04)	−0.16 (−0.98)	0.29 (1.82)	0.52 (3.63)	0.44 (2.98)
GVAsv	0.88 (14.25)	−0.18 (−1.08)	−0.01 (−0.07)	0.33 (2.10)	0.30 (1.90)	0.42 (2.78)	0.67 (5.45)	0.53 (3.76)	−0.17 (−1.03)	0.67 (5.48)	0.58 (4.26)	0.54 (4.14)	−0.21 (−1.38)	−0.03 (−0.16)	0.56 (4.42)	0.30 (2.02)	−0.03 (−0.24)	0.74 (8.77)	0.74 (8.63)	0.46 (4.04)	1.00 (−)	−0.19 (−1.19)	0.33 (2.13)	0.65 (5.19)	0.50 (3.50)
EMPa	−0.18 (−1.12)	1.00 (153.70)	0.41 (2.68)	−0.37 (−2.42)	−0.37 (−2.39)	−0.47 (−3.15)	−0.36 (−2.32)	−0.72 (−6.20)	−0.62 (−4.71)	−0.37 (−2.38)	−0.18 (−1.09)	−0.28 (−1.77)	−0.12 (−0.75)	−0.03 (−0.15)	−0.47 (−3.21)	0.07 (0.39)	0.51 (3.52)	−0.29 (−1.82)	−0.38 (−2.43)	−0.16 (−0.98)	−0.19 (−1.19)	1.00 (−)	−0.44 (−2.97)	−0.36 (−2.29)	−0.61 (−4.60
EMPin	0.58 (4.33)	−0.45 (−2.98)	−0.37 (−2.42)	0.82 (8.67)	0.82 (8.59)	0.89 (11.55)	0.62 (4.73)	0.66 (5.29)	0.07 (0.41)	0.33 (2.09)	0.49 (3.39)	0.70 (5.94)	−0.26 (−1.61)	0.39 (2.51)	0.59 (4.39)	0.51 (3.52)	−0.06 (−0.37)	0.78 (7.49)	0.19 (1.18)	0.29 (1.82)	0.33 (2.13)	−0.44 (−2.97)	1.00 (−)	0.62 (4.77)	0.58 (4.25)
EMPc	0.72 (6.15)	−0.35 (−2.26)	−0.30 (−1.85)	0.69 (5.69)	0.41 (2.73)	0.63 (4.93)	1.00 (152.18)	0.85 (9.64)	0.11 (0.65)	0.89 (11.57)	0.86 (10.28)	0.55 (3.93)	−0.17 (−1.05)	−0.25 (−1.57)	0.65 (5.19)	0.36 (2.35)	−0.49 (−3.39)	0.63 (4.88)	0.84 (9.23)	0.52 (3.63)	0.65 (5.19)	−0.36 (−2.29)	0.62 (4.77)	1.00 (−)	0.88 (11.02
EMPs	0.54 (3.86)	−0.60 (−4.53)	−0.55 (−3.91)	0.62 (4.73)	0.33 (2.09)	0.69 (5.75)	0.88 (11.20)	0.96 (19.50)	0.50 (3.48)	0.88 (10.85)	0.84 (9.22)	0.53 (3.77)	0.12 (0.72)	−0.13 (−0.81)	0.47 (3.23)	0.43 (2.88)	−0.59 (−4.40)	0.51 (3.52)	0.78 (7.39)	0.44 (2.98)	0.50 (3.50)	−0.61 (−4.60)	0.58 (4.25)	0.88 (11.02)	1.00 (−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

Table 35: Correlations of sectoral employment and output. First Differences. 1986.1-1998.2

	GDP	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	GVAag	GVAin	GVAco	GVAsnv	GVAsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00 (−)	0.16 (0.81)	0.28 (1.50)	0.41 (2.28)	0.51 (3.05)	0.81 (7.05)	0.75 (5.71)	0.63 (4.17)	0.41 (2.30)	0.28 (1.48)	0.29 (1.53)	0.46 (3.57)	0.17 (1.16)	0.24 (1.73)	0.46 (3.57)	0.24 (1.75)	0.06 (0.39)	0.70 (6.71)	0.78 (8.63)	0.56 (4.71)	0.85 (11.19)	0.11 (0.79)	0.72 (7.28)	0.64 (5.77)	0.71 (6.93)
EMPag	0.16 (0.81)	1.00 (−)	0.05 (0.23)	−0.43 (−2.40)	0.20 (1.07)	0.15 (0.78)	0.06 (0.32)	0.05 (0.23)	0.09 (0.47)	−0.09 (−0.46)	−0.17 (−0.88)	0.07 (0.36)	0.01 (0.03)	0.02 (0.10)	0.07 (0.36)	0.27 (1.43)	0.36 (1.97)	0.02 (0.11)	0.11 (0.56)	0.00 (−0.02)	0.05 (0.26)	0.98 (25.45)	0.08 (0.43)	0.08 (0.41)	−0.07 (−0.35)
EMPen	0.28 (1.50)	0.05 (0.23)	1.00 (−)	0.08 (0.39)	0.19 (1.01)	0.14 (0.75)	0.07 (0.38)	0.21 (1.12)	0.33 (1.76)	0.15 (0.77)	0.25 (1.29)	0.30 (1.58)	0.09 (0.45)	0.43 (2.40)	0.30 (1.58)	0.34 (1.81)	−0.09 (−0.46)	0.25 (1.29)	0.31 (1.69)	0.35 (1.88)	0.25 (1.34)	0.10 (0.53)	0.31 (1.68)	0.04 (0.19)	0.35 (1.89)
EMPmin	0.41 (2.28)	−0.43 (−2.40)	0.08 (0.39)	1.00 (−)	0.27 (1.40)	0.17 (0.90)	0.35 (1.88)	0.14 (0.75)	0.22 (1.14)	0.32 (1.70)	0.32 (1.71)	0.32 (1.74)	0.08 (0.41)	0.11 (0.54)	0.32 (1.74)	0.00 (−0.03)	−0.21 (−1.11)	0.34 (1.85)	0.46 (2.61)	0.38 (2.08)	0.54 (3.25)	−0.44 (−2.48)	0.31 (1.66)	0.42 (2.33)	0.31 (1.67)
EMPitra	0.51 (3.05)	0.20 (1.07)	0.19 (1.01)	0.27 (1.40)	1.00 (−)	0.46 (2.61)	0.32 (1.71)	0.40 (2.21)	0.48 (2.77)	0.07 (0.36)	0.09 (0.48)	0.51 (3.03)	0.19 (0.96)	0.27 (1.41)	0.51 (3.03)	0.28 (1.47)	0.15 (0.76)	0.54 (3.27)	0.34 (1.86)	0.09 (0.44)	0.46 (2.64)	0.21 (1.11)	0.73 (5.51)	0.42 (2.37)	0.39 (2.18)
EMPima	0.81 (7.05)	0.15 (0.78)	0.14 (0.75)	0.17 (0.90)	0.46 (2.61)	1.00 (−)	0.61 (3.95)	0.54 (3.29)	0.37 (2.04)	0.24 (1.25)	0.39 (2.17)	0.40 (2.24)	0.08 (0.42)	0.20 (1.06)	0.40 (2.24)	0.35 (1.90)	0.30 (1.61)	0.71 (5.12)	0.61 (3.96)	0.37 (2.05)	0.67 (4.58)	0.14 (0.71)	0.83 (7.68)	0.57 (3.58)	0.74 (5.55)
EMPco	0.75 (5.71)	0.06 (0.32)	0.07 (0.38)	0.35 (1.88)	0.32 (1.71)	0.61 (3.95)	1.00 (−)	0.46 (2.65)	0.24 (1.25)	0.21 (1.12)	0.12 (0.64)	0.17 (0.90)	0.07 (0.37)	0.23 (1.20)	0.17 (0.90)	0.17 (0.90)	0.10 (0.52)	0.52 (3.09)	0.84 (7.84)	0.61 (3.95)	0.71 (5.19)	0.04 (0.21)	0.55 (3.32)	0.94 (13.95)	0.52 (3.06)
EMPcom	0.63 (4.17)	0.05 (0.23)	0.21 (1.12)	0.14 (0.75)	0.40 (2.21)	0.54 (3.29)	0.46 (2.65)	1.00 (−)	0.08 (0.39)	0.09 (0.47)	−0.13 (−0.66)	0.27 (1.45)	0.10 (0.53)	0.23 (1.21)	0.27 (1.45)	0.28 (1.51)	0.22 (1.16)	0.55 (3.37)	0.53 (3.22)	0.33 (1.77)	0.50 (2.93)	0.05 (0.24)	0.54 (3.29)	0.40 (2.22)	0.66 (4.51)
EMPtra	0.41 (2.30)	0.09 (0.47)	0.33 (1.76)	0.22 (1.14)	0.48 (2.77)	0.37 (2.04)	0.24 (1.25)	0.08 (0.39)	1.00 (−)	0.09 (0.44)	0.37 (2.05)	0.29 (1.54)	0.18 (0.94)	0.28 (1.51)	0.29 (1.54)	0.18 (0.93)	−0.24 (−1.25)	0.50 (2.94)	0.39 (2.15)	0.18 (0.92)	0.42 (2.36)	0.10 (0.50)	0.47 (2.71)	0.26 (1.36)	0.44 (2.47)
EMPfin	0.28 (1.48)	−0.09 (−0.46)	0.15 (0.77)	0.32 (1.70)	0.07 (0.36)	0.24 (1.25)	0.21 (1.12)	0.09 (0.47)	0.09 (0.44)	1.00 (−)	0.34 (1.82)	0.12 (0.59)	0.04 (0.21)	−0.11 (−0.58)	0.12 (0.59)	−0.01 (−0.04)	−0.08 (−0.39)	0.34 (1.84)	0.18 (0.95)	0.14 (0.74)	0.28 (1.50)	−0.06 (−0.33)	0.13 (0.69)	0.21 (1.10)	0.46 (2.67)
EMPser	0.29 (1.53)	−0.17 (−0.88)	0.25 (1.29)	0.32 (1.71)	0.09 (0.48)	0.39 (2.17)	0.12 (0.64)	−0.13 (−0.66)	0.37 (2.05)	0.34 (1.82)	1.00 (−)	0.36 (1.99)	0.12 (0.64)	0.34 (1.83)	0.36 (1.99)	0.44 (2.52)	−0.34 (−1.87)	0.36 (1.99)	0.27 (1.44)	−0.03 (−0.15)	0.33 (1.79)	−0.14 (−0.73)	0.34 (1.85)	0.17 (0.88)	0.59 (3.74)
IPIg	0.46 (3.57)	0.07 (0.36)	0.30 (1.58)	0.32 (1.74)	0.51 (3.03)	0.40 (2.24)	0.17 (0.90)	0.27 (1.45)	0.29 (1.54)	0.12 (0.59)	0.36 (1.99)	1.00 (−)	0.27 (1.96)	0.69 (6.53)	1.00 (−)	0.53 (4.28)	−0.14 (−0.96)	0.58 (4.92)	0.26 (1.84)	−0.04 (−0.26)	0.50 (4.02)	0.08 (0.55)	0.46 (3.55)	0.21 (1.49)	0.28 (1.98)
IPIen	0.17 (1.16)	0.01 (0.03)	0.09 (0.45)	0.08 (0.41)	0.19 (0.96)	0.08 (0.42)	0.07 (0.37)	0.10 (0.53)	0.18 (0.94)	0.04 (0.21)	0.12 (0.64)	0.27 (1.96)	1.00 (−)	0.36 (2.65)	0.27 (1.96)	0.02 (0.13)	−0.06 (−0.41)	0.12 (0.86)	0.16 (1.12)	0.09 (0.64)	0.24 (1.74)	−0.04 (−0.29)	0.15 (1.06)	0.05 (0.35)	0.09 (0.63)
IPIex	0.24 (1.73)	0.02 (0.10)	0.43 (2.40)	0.11 (0.54)	0.27 (1.41)	0.20 (1.06)	0.23 (1.20)	0.23 (1.21)	0.28 (1.51)	−0.11 (−0.58)	0.34 (1.83)	0.69 (6.53)	0.36 (2.65)	1.00 (−)	0.69 (6.53)	0.56 (4.73)	−0.26 (−1.85)	0.43 (3.33)	0.17 (1.16)	−0.12 (−0.81)	0.32 (2.37)	0.13 (0.87)	0.23 (1.67)	0.07 (0.48)	0.06 (0.40)
IPItr	0.46 (3.57)	0.07 (0.36)	0.30 (1.58)	0.32 (1.74)	0.51 (3.03)	0.40 (2.24)	0.17 (0.90)	0.27 (1.45)	0.29 (1.54)	0.12 (0.59)	0.36 (1.99)	1.00 (−)	0.27 (1.96)	0.69 (6.53)	1.00 (−)	0.53 (4.28)	−0.14 (−0.96)	0.58 (4.92)	0.26 (1.84)	−0.04 (−0.26)	0.50 (4.02)	0.08 (0.55)	0.46 (3.55)	0.21 (1.49)	0.28 (1.98)
IPIot	0.24 (1.75)	0.27 (1.43)	0.34 (1.81)	0.00 (−0.03)	0.28 (1.47)	0.35 (1.90)	0.17 (0.90)	0.28 (1.51)	0.18 (0.93)	−0.01 (−0.04)	0.44 (2.52)	0.53 (4.28)	0.02 (0.13)	0.56 (4.73)	0.53 (4.28)	1.00 (−)	−0.15 (−1.03)	0.45 (3.52)	0.14 (0.95)	−0.12 (−0.81)	0.32 (2.36)	0.22 (1.54)	0.26 (1.84)	0.22 (1.53)	0.22 (1.57)
GVAag	0.06 (0.39)	0.36 (1.97)	−0.09 (−0.46)	−0.21 (−1.11)	0.15 (0.76)	0.30 (1.61)	0.10 (0.52)	0.22 (1.16)	−0.24 (−1.25)	−0.08 (−0.39)	−0.34 (−1.87)	−0.14 (−0.96)	−0.06 (−0.41)	−0.26 (−1.85)	−0.14 (−0.96)	−0.15 (−1.03)	1.00 (−)	−0.24 (−1.71)	−0.24 (−1.69)	0.04 (0.29)	−0.12 (−0.86)	0.17 (1.18)	0.05 (0.35)	0.01 (0.06)	0.10 (0.71)
GVAin	0.70 (6.71)	0.02 (0.11)	0.25 (1.29)	0.34 (1.85)	0.54 (3.27)	0.71 (5.12)	0.52 (3.09)	0.55 (3.37)	0.50 (2.94)	0.34 (1.84)	0.36 (1.99)	0.58 (4.92)	0.12 (0.86)	0.43 (3.33)	0.58 (4.92)	0.45 (3.52)	−0.24 (−1.71)	1.00 (−)	0.46 (3.57)	0.06 (0.44)	0.72 (7.23)	0.10 (0.71)	0.71 (6.90)	0.41 (3.11)	0.54 (4.43)
GVAco	0.78 (8.63)	0.11 (0.56)	0.31 (1.69)	0.46 (2.61)	0.34 (1.86)	0.61 (3.96)	0.84 (7.84)	0.53 (3.22)	0.39 (2.15)	0.18 (0.95)	0.27 (1.44)	0.26 (1.84)	0.16 (1.12)	0.17 (1.16)	0.26 (1.84)	0.14 (0.95)	−0.24 (−1.69)	0.46 (3.57)	1.00 (−)	0.62 (5.51)	0.66 (6.06)	0.04 (0.25)	0.54 (4.43)	0.62 (5.54)	0.58 (4.97)
GVAsnv	0.56 (4.71)	0.00 (−0.02)	0.35 (1.88)	0.38 (2.08)	0.09 (0.44)	0.37 (2.05)	0.61 (3.95)	0.33 (1.77)	0.18 (0.92)	0.14 (0.74)	−0.03 (−0.15)	−0.04 (−0.26)	0.09 (0.64)	−0.12 (−0.81)	−0.04 (−0.26)	−0.12 (−0.81)	0.04 (0.29)	0.06 (0.44)	0.62 (5.51)	1.00 (−)	0.36 (2.67)	−0.22 (−1.55)	0.25 (1.82)	0.52 (4.23)	0.38 (2.81)
GVAsv	0.85 (11.19)	0.05 (0.26)	0.25 (1.34)	0.54 (3.25)	0.46 (2.64)	0.67 (4.58)	0.71 (5.19)	0.50 (2.93)	0.42 (2.36)	0.28 (1.50)	0.33 (1.79)	0.50 (4.02)	0.24 (1.74)	0.32 (2.37)	0.50 (4.02)	0.32 (2.36)	−0.12 (−0.86)	0.72 (7.23)	0.66 (6.06)	0.36 (2.67)	1.00 (−)	0.04 (0.30)	0.68 (6.42)	0.58 (4.97)	0.56 (4.73)
EMPa	0.11 (0.79)	0.98 (25.45)	0.10 (0.53)	−0.44 (−2.48)	0.21 (1.11)	0.14 (0.71)	0.04 (0.21)	0.05 (0.24)	0.10 (0.50)	−0.06 (−0.33)	−0.14 (−0.73)	0.08 (0.55)	−0.04 (−0.29)	0.13 (0.87)	0.08 (0.55)	0.22 (1.54)	0.17 (1.18)	0.10 (0.71)	0.04 (0.25)	−0.22 (−1.55)	0.04 (0.30)	1.00 (−)	0.10 (0.70)	−0.06 (−0.45)	−0.03 (−0.22)
EMPin	0.72 (7.28)	0.08 (0.43)	0.31 (1.68)	0.31 (1.66)	0.73 (5.51)	0.83 (7.68)	0.55 (3.32)	0.54 (3.29)	0.47 (2.71)	0.13 (0.69)	0.34 (1.85)	0.46 (3.55)	0.15 (1.06)	0.23 (1.67)	0.46 (3.55)	0.26 (1.84)	0.05 (0.35)	0.71 (6.90)	0.54 (4.43)	0.25 (1.82)	0.68 (6.42)	0.10 (0.70)	1.00 (−)	0.50 (4.02)	0.61 (5.34)
EMPc	0.64 (5.77)	0.08 (0.41)	0.04 (0.19)	0.42 (2.33)	0.42 (2.37)	0.57 (3.58)	0.94 (13.95)	0.40 (2.22)	0.26 (1.36)	0.21 (1.10)	0.17 (0.88)	0.21 (1.49)	0.05 (0.35)	0.07 (0.48)	0.21 (1.49)	0.22 (1.53)	0.01 (0.06)	0.41 (3.11)	0.62 (5.54)	0.52 (4.23)	0.58 (4.97)	−0.06 (−0.45)	0.50 (4.02)	1.00 (−)	0.51 (4.12)
EMPs	0.71 (6.93)	−0.07 (−0.35)	0.35 (1.89)	0.31 (1.67)	0.39 (2.18)	0.74 (5.55)	0.52 (3.06)	0.66 (4.51)	0.44 (2.47)	0.46 (2.67)	0.59 (3.74)	0.28 (1.98)	0.09 (0.63)	0.06 (0.40)	0.28 (1.98)	0.22 (1.57)	0.10 (0.71)	0.54 (4.43)	0.58 (4.97)	0.38 (2.81)	0.56 (4.73)	−0.03 (−0.22)	0.61 (5.34)	0.51 (4.12)	1.00 (−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

Table 36: Correlations of sectoral employment and output. Hodrick-Prescott Filter.
1986.1-1998.2

	GDP	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	GVAag	GVAin	GVAco	GVAsnv	GVAsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00	0.49	0.43	0.65	0.78	0.81	0.94	0.78	0.57	0.53	0.42	0.74	0.42	0.51	0.74	0.46	0.17	0.85	0.85	0.65	0.93	0.43	0.89	0.91	0.88
	(−)	(2.88)	(2.43)	(4.36)	(6.39)	(7.17)	(13.59)	(6.39)	(3.55)	(3.19)	(2.33)	(7.54)	(3.25)	(4.05)	(7.54)	(3.60)	(1.21)	(11.11)	(11.00)	(5.89)	(17.34)	(3.33)	(13.58)	(15.52)	(12.87)
EMPag	0.49	1.00	0.30	0.06	0.57	0.50	0.42	0.48	0.19	0.26	0.03	0.61	−0.20	0.41	0.61	0.21	0.33	0.43	0.30	0.00	0.60	0.99	0.29	0.32	0.31
	(2.88)	(−)	(1.62)	(0.31)	(3.49)	(2.93)	(2.33)	(2.82)	(0.98)	(1.35)	(0.18)	(3.94)	(−1.03)	(2.28)	(3.94)	(1.08)	(1.80)	(2.42)	(1.63)	(−0.02)	(3.84)	(42.17)	(1.55)	(1.74)	(1.65)
EMPen	0.43	0.30	1.00	0.70	0.28	0.25	0.47	0.21	0.61	0.20	0.42	0.32	0.36	0.70	0.32	0.08	−0.31	0.34	0.66	0.36	0.57	0.36	0.36	0.38	0.41
	(2.43)	(1.62)	(−)	(4.96)	(1.48)	(1.29)	(2.68)	(1.09)	(3.95)	(1.05)	(2.35)	(1.74)	(1.95)	(5.00)	(1.74)	(0.41)	(−1.68)	(1.82)	(4.50)	(1.98)	(3.53)	(1.96)	(1.97)	(2.07)	(2.29)
EMPmin	0.65	0.06	0.70	1.00	0.45	0.40	0.68	0.28	0.70	0.35	0.65	0.30	0.52	0.55	0.30	0.13	−0.19	0.48	0.84	0.66	0.69	0.11	0.67	0.69	0.68
	(4.36)	(0.31)	(4.96)	(−)	(2.54)	(2.26)	(4.77)	(1.48)	(4.94)	(1.92)	(4.41)	(1.63)	(3.09)	(3.33)	(1.63)	(0.69)	(−0.98)	(2.82)	(8.03)	(4.44)	(4.89)	(0.55)	(4.63)	(4.85)	(4.76)
EMPitra	0.78	0.57	0.28	0.45	1.00	0.73	0.66	0.61	0.54	0.22	0.34	0.67	0.22	0.45	0.67	0.39	0.42	0.71	0.58	0.41	0.77	0.58	0.80	0.66	0.68
	(6.39)	(3.49)	(1.48)	(2.54)	(−)	(5.41)	(4.42)	(3.94)	(3.24)	(1.17)	(1.84)	(4.66)	(1.14)	(2.59)	(4.66)	(2.17)	(2.38)	(5.18)	(3.62)	(2.28)	(6.12)	(3.61)	(6.82)	(4.49)	(4.69)
EMPima	0.81	0.50	0.25	0.40	0.73	1.00	0.79	0.81	0.33	0.49	0.45	0.63	0.07	0.38	0.63	0.62	0.54	0.71	0.67	0.38	0.73	0.53	0.75	0.73	0.80
	(7.17)	(2.93)	(1.29)	(2.26)	(5.41)	(−)	(6.49)	(7.15)	(1.77)	(2.84)	(2.59)	(4.13)	(0.38)	(2.09)	(4.13)	(4.03)	(3.31)	(5.10)	(4.62)	(2.10)	(5.45)	(3.17)	(5.71)	(5.52)	(6.90)
EMPco	0.94	0.42	0.47	0.68	0.66	0.79	1.00	0.75	0.52	0.54	0.42	0.52	0.37	0.59	0.52	0.36	0.34	0.68	0.92	0.69	0.90	0.45	0.81	0.98	0.88
	(13.59)	(2.33)	(2.68)	(4.77)	(4.42)	(6.49)	(−)	(5.83)	(3.11)	(3.30)	(2.35)	(3.13)	(2.05)	(3.69)	(3.13)	(1.99)	(1.87)	(4.78)	(12.02)	(4.84)	(10.34)	(2.59)	(7.14)	(22.94)	(9.57)
EMPcom	0.78	0.48	0.21	0.28	0.61	0.81	0.75	1.00	0.15	0.56	0.05	0.58	0.14	0.40	0.58	0.44	0.65	0.67	0.60	0.37	0.67	0.51	0.61	0.70	0.73
	(6.39)	(2.82)	(1.09)	(1.48)	(3.94)	(7.15)	(5.83)	(−)	(0.77)	(3.40)	(0.25)	(3.59)	(0.74)	(2.24)	(3.59)	(2.51)	(4.32)	(4.66)	(3.80)	(2.03)	(4.58)	(3.05)	(3.90)	(4.97)	(5.51)
EMPtra	0.57	0.19	0.61	0.70	0.54	0.33	0.52	0.15	1.00	0.08	0.65	0.35	0.62	0.68	0.35	0.23	−0.30	0.53	0.69	0.54	0.64	0.21	0.63	0.52	0.62
	(3.55)	(0.98)	(3.95)	(4.94)	(3.24)	(1.77)	(3.11)	(0.77)	(−)	(0.41)	(4.35)	(1.93)	(4.00)	(4.77)	(1.93)	(1.18)	(−1.62)	(3.16)	(4.92)	(3.30)	(4.27)	(1.10)	(4.09)	(3.14)	(4.07)
EMPfin	0.53	0.26	0.20	0.35	0.22	0.49	0.54	0.56	0.08	1.00	0.21	0.37	0.19	0.25	0.37	0.24	0.33	0.47	0.44	0.29	0.47	0.29	0.34	0.51	0.58
	(3.19)	(1.35)	(1.05)	(1.92)	(1.17)	(2.84)	(3.30)	(3.40)	(0.41)	(−)	(1.12)	(2.05)	(0.98)	(1.29)	(2.05)	(1.26)	(1.78)	(2.69)	(2.47)	(1.55)	(2.75)	(1.57)	(1.81)	(3.06)	(3.63)
EMPser	0.42	0.03	0.42	0.65	0.34	0.45	0.42	0.05	0.65	0.21	1.00	0.28	0.27	0.41	0.28	0.51	−0.28	0.35	0.58	0.37	0.44	0.07	0.52	0.43	0.61
	(2.33)	(0.18)	(2.35)	(4.41)	(1.84)	(2.59)	(2.35)	(0.25)	(4.35)	(1.12)	(−)	(1.47)	(1.46)	(2.30)	(1.47)	(3.03)	(−1.48)	(1.89)	(3.60)	(2.01)	(2.49)	(0.36)	(3.10)	(2.41)	(3.92)
IPIg	0.74	0.61	0.32	0.30	0.67	0.63	0.52	0.58	0.35	0.37	0.28	1.00	0.26	0.76	1.00	0.64	−0.20	0.87	0.57	0.10	0.82	0.43	0.55	0.57	0.56
	(7.54)	(3.94)	(1.74)	(1.63)	(4.66)	(4.13)	(3.13)	(3.59)	(1.93)	(2.05)	(1.47)	(−)	(1.88)	(8.07)	(−)	(5.73)	(−1.43)	(12.22)	(4.86)	(0.69)	(9.94)	(3.27)	(4.55)	(4.77)	(4.71)
IPIen	0.42	−0.20	0.36	0.52	0.22	0.07	0.37	0.14	0.62	0.19	0.27	0.26	1.00	0.40	0.26	0.18	−0.13	0.38	0.44	0.48	0.41	−0.09	0.42	0.37	0.36
	(3.25)	(−1.03)	(1.95)	(3.09)	(1.14)	(0.38)	(2.05)	(0.74)	(4.00)	(0.98)	(1.46)	(1.88)	(−)	(2.99)	(1.88)	(1.26)	(−0.93)	(2.80)	(3.42)	(3.83)	(3.08)	(−0.64)	(3.20)	(2.74)	(2.64)
IPIex	0.51	0.41	0.70	0.55	0.45	0.38	0.59	0.40	0.68	0.25	0.41	0.76	0.40	1.00	0.76	0.64	−0.54	0.68	0.54	0.06	0.67	0.34	0.31	0.32	0.21
	(4.05)	(2.28)	(5.00)	(3.33)	(2.59)	(2.09)	(3.69)	(2.24)	(4.77)	(1.29)	(2.30)	(8.07)	(2.99)	(−)	(8.07)	(5.83)	(−4.41)	(6.43)	(4.44)	(0.44)	(6.31)	(2.47)	(2.26)	(2.32)	(1.50)
IPItr	0.74	0.61	0.32	0.30	0.67	0.63	0.52	0.58	0.35	0.37	0.28	1.00	0.26	0.76	1.00	0.64	−0.20	0.87	0.57	0.10	0.82	0.43	0.55	0.57	0.56
	(7.54)	(3.94)	(1.74)	(1.63)	(4.66)	(4.13)	(3.13)	(3.59)	(1.93)	(2.05)	(1.47)	(−)	(1.88)	(8.07)	(−)	(5.73)	(−1.43)	(12.22)	(4.86)	(0.69)	(9.94)	(3.27)	(4.55)	(4.77)	(4.71)
IPIot	0.46	0.21	0.08	0.13	0.39	0.62	0.36	0.44	0.23	0.24	0.51	0.64	0.18	0.64	0.64	1.00	−0.24	0.70	0.32	−0.06	0.55	0.25	0.37	0.32	0.27
	(3.60)	(1.08)	(0.41)	(0.69)	(2.17)	(4.03)	(1.99)	(2.51)	(1.18)	(1.26)	(3.03)	(5.73)	(1.26)	(5.83)	(5.73)	(−)	(−1.72)	(6.77)	(2.38)	(−0.40)	(4.50)	(1.78)	(2.78)	(2.31)	(1.97)
GVAag	0.17	0.33	−0.31	−0.19	0.42	0.54	0.34	0.65	−0.30	0.33	−0.28	−0.20	−0.13	−0.54	−0.20	−0.24	1.00	−0.12	−0.15	0.21	−0.01	0.20	0.17	0.22	0.34
	(1.21)	(1.80)	(−1.68)	(−0.98)	(2.38)	(3.31)	(1.87)	(4.32)	(−1.62)	(1.78)	(−1.48)	(−1.43)	(−0.93)	(−4.41)	(−1.43)	(−1.72)	(−)	(−0.87)	(−1.03)	(1.48)	(−0.09)	(1.40)	(1.21)	(1.57)	(2.53)
GVAin	0.85	0.43	0.34	0.48	0.71	0.71	0.68	0.67	0.53	0.47	0.35	0.87	0.38	0.68	0.87	0.70	−0.12	1.00	0.67	0.30	0.85	0.33	0.75	0.69	0.69
	(11.11)	(2.42)	(1.82)	(2.82)	(5.18)	(5.10)	(4.78)	(4.66)	(3.16)	(2.69)	(1.89)	(12.22)	(2.80)	(6.43)	(12.22)	(6.77)	(−0.87)	(−)	(6.31)	(2.19)	(11.28)	(2.43)	(7.79)	(6.62)	(6.58)
GVAco	0.85	0.30	0.66	0.84	0.58	0.67	0.92	0.60	0.69	0.44	0.58	0.57	0.44	0.54	0.57	0.32	−0.15	0.67	1.00	0.70	0.81	0.27	0.82	0.83	0.76
	(11.00)	(1.63)	(4.50)	(8.03)	(3.62)	(4.62)	(12.02)	(3.80)	(4.92)	(2.47)	(3.60)	(4.86)	(3.42)	(4.44)	(4.86)	(2.38)	(−1.03)	(6.31)	(−)	(6.81)	(9.65)	(1.96)	(9.94)	(10.35)	(8.07)
GVAsnv	0.65	0.00	0.36	0.66	0.41	0.38	0.69	0.37	0.54	0.29	0.37	0.10	0.48	0.06	0.10	−0.06	0.21	0.30	0.70	1.00	0.46	−0.03	0.72	0.75	0.65
	(5.89)	(−0.02)	(1.98)	(4.44)	(2.28)	(2.10)	(4.84)	(2.03)	(3.30)	(1.55)	(2.01)	(0.69)	(3.83)	(0.44)	(0.69)	(−0.40)	(1.48)	(2.19)	(6.81)	(−)	(3.58)	(−0.19)	(7.26)	(7.95)	(5.89)
GVAsv	0.93	0.60	0.57	0.69	0.77	0.73	0.90	0.67	0.64	0.47	0.44	0.82	0.41	0.67	0.82	0.55	−0.01	0.85	0.81	0.46	1.00	0.51	0.78	0.83	0.75
	(17.34)	(3.84)	(3.53)	(4.89)	(6.12)	(5.45)	(10.34)	(4.58)	(4.27)	(2.75)	(2.49)	(9.94)	(3.08)	(6.31)	(9.94)	(4.50)	(−0.09)	(11.28)	(9.65)	(3.58)	(−)	(4.11)	(8.58)	(10.14)	(7.95)
EMPa	0.43	0.99	0.36	0.11	0.58	0.53	0.45	0.51	0.21	0.29	0.07	0.43	−0.09	0.34	0.43	0.25	0.20	0.33	0.27	−0.03	0.51	1.00	0.22	0.27	0.26
	(3.33)	(42.17)	(1.96)	(0.55)	(3.61)	(3.17)	(2.59)	(3.05)	(1.10)	(1.57)	(0.36)	(3.27)	(−0.64)	(2.47)	(3.27)	(1.78)	(1.40)	(2.43)	(1.96)	(−0.19)	(4.11)	(−)	(1.57)	(1.92)	(1.87)
EMPin	0.89	0.29	0.36	0.67	0.80	0.75	0.81	0.61	0.63	0.34	0.52	0.55	0.42	0.31	0.55	0.37	0.17	0.75	0.82	0.72	0.78	0.22	1.00	0.85	0.86
	(13.58)	(1.55)	(1.97)	(4.63)	(6.82)	(5.71)	(7.14)	(3.90)	(4.09)	(1.81)	(3.10)	(4.55)	(3.20)	(2.26)	(4.55)	(2.78)	(1.21)	(7.79)	(9.94)	(7.26)	(8.58)	(1.57)	(−)	(11.37)	(11.92)
EMPc	0.91	0.32	0.38	0.69	0.66	0.73	0.98	0.70	0.52	0.51	0.43	0.57	0.37	0.32	0.57	0.32	0.22	0.69	0.83	0.75	0.83	0.27	0.85	1.00	0.89
	(15.52)	(1.74)	(2.07)	(4.85)	(4.49)	(5.52)	(22.94)	(4.97)	(3.14)	(3.06)	(2.41)	(4.77)	(2.74)	(2.32)	(4.77)	(2.31)	(1.57)	(6.62)	(10.35)	(7.95)	(10.14)	(1.92)	(11.37)	(−)	(13.27)
EMPs	0.88	0.31	0.41	0.68	0.68	0.80	0.88	0.73	0.62	0.58	0.61	0.56	0.36	0.21	0.56	0.27	0.34	0.69	0.76	0.65	0.75	0.26	0.86	0.89	1.00
	(12.87)	(1.65)	(2.29)	(4.76)	(4.69)	(6.90)	(9.57)	(5.51)	(4.07)	(3.63)	(3.92)	(4.71)	(2.64)	(1.50)	(4.71)	(1.97)	(2.53)	(6.58)	(8.07)	(5.89)	(7.95)	(1.87)	(11.92)	(13.27)	(−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

Table 37: Correlaciones de empleo y producci'on sectorial. Filtro Baxter-King. 1986.1-1998.2

	PIB	EMPag	EMPen	EMPmin	EMPitra	EMPima	EMPco	EMPcom	EMPtra	EMPfin	EMPser	IPIg	IPIen	IPIex	IPItr	IPIot	VABag	VABin	VABco	VABsnv	VABsv	EMPa	EMPin	EMPc	EMPs
GDP	1.00 (−)	0.49 (2.88)	0.36 (1.94)	0.62 (4.02)	0.85 (8.08)	0.84 (7.93)	0.93 (13.44)	0.86 (8.42)	0.56 (3.42)	0.73 (5.47)	0.44 (2.52)	0.69 (6.64)	0.51 (4.13)	0.48 (3.76)	0.74 (7.70)	0.48 (3.79)	0.16 (1.10)	0.84 (10.69)	0.82 (9.96)	0.63 (5.57)	0.92 (16.41)	0.42 (3.20)	0.88 (12.78)	0.90 (14.42)	0.86 (11.53)
EMPag	0.49 (2.88)	1.00 (−)	0.34 (1.87)	0.10 (0.49)	0.59 (3.75)	0.44 (2.52)	0.36 (1.98)	0.46 (2.62)	0.16 (0.84)	0.33 (1.76)	0.03 (0.17)	0.51 (3.00)	−0.26 (−1.36)	0.45 (2.60)	0.71 (5.09)	0.18 (0.92)	0.40 (2.19)	0.42 (2.33)	0.26 (1.39)	0.00 (0.02)	0.62 (4.04)	0.99 (33.67)	0.30 (1.61)	0.27 (1.45)	0.26 (1.37)
EMPen	0.36 (1.94)	0.34 (1.87)	1.00 (−)	0.82 (7.21)	0.22 (1.17)	0.16 (0.84)	0.43 (2.41)	0.09 (0.48)	0.62 (4.02)	0.13 (0.69)	0.44 (2.49)	0.43 (2.43)	0.43 (2.40)	0.74 (5.58)	0.29 (1.54)	0.01 (0.06)	−0.42 (−2.35)	0.24 (1.27)	0.66 (4.51)	0.31 (1.67)	0.57 (3.49)	0.39 (2.14)	0.30 (1.63)	0.35 (1.88)	0.29 (1.54)
EMPmin	0.62 (4.02)	0.10 (0.49)	0.82 (7.21)	1.00 (−)	0.45 (2.54)	0.40 (2.23)	0.68 (4.69)	0.28 (1.51)	0.78 (6.30)	0.29 (1.56)	0.69 (4.88)	0.43 (2.43)	0.61 (3.96)	0.60 (3.84)	0.24 (1.28)	0.10 (0.50)	−0.27 (−1.46)	0.45 (2.56)	0.89 (9.87)	0.68 (4.71)	0.67 (4.64)	0.10 (0.51)	0.67 (4.66)	0.66 (4.53)	0.64 (4.29)
EMPitra	0.85 (8.08)	0.59 (3.75)	0.22 (1.17)	0.45 (2.54)	1.00 (−)	0.78 (6.36)	0.69 (4.88)	0.64 (4.25)	0.50 (2.98)	0.34 (1.87)	0.42 (2.34)	0.57 (3.56)	0.12 (0.63)	0.33 (1.77)	0.68 (4.69)	0.34 (1.86)	0.49 (2.87)	0.73 (5.46)	0.61 (3.89)	0.51 (3.02)	0.82 (7.39)	0.55 (3.37)	0.89 (9.70)	0.68 (4.77)	0.71 (5.20)
EMPima	0.84 (7.93)	0.44 (2.52)	0.16 (0.84)	0.40 (2.23)	0.78 (6.36)	1.00 (−)	0.81 (7.06)	0.88 (9.47)	0.33 (1.79)	0.68 (4.70)	0.54 (3.23)	0.62 (4.08)	0.04 (0.23)	0.26 (1.37)	0.60 (3.87)	0.68 (4.67)	0.54 (3.31)	0.73 (5.43)	0.70 (5.06)	0.47 (2.75)	0.71 (5.19)	0.44 (2.49)	0.83 (7.71)	0.78 (6.29)	0.87 (8.94)
EMPco	0.93 (13.44)	0.36 (1.98)	0.43 (2.41)	0.68 (4.69)	0.69 (4.88)	0.81 (7.06)	1.00 (−)	0.84 (7.97)	0.54 (3.28)	0.78 (6.28)	0.48 (2.76)	0.59 (3.76)	0.40 (2.19)	0.48 (2.81)	0.52 (3.07)	0.38 (2.08)	0.32 (1.71)	0.71 (5.10)	0.92 (12.09)	0.74 (5.67)	0.89 (10.04)	0.34 (1.87)	0.85 (8.07)	0.98 (27.98)	0.91 (11.44)
EMPcom	0.86 (8.42)	0.46 (2.62)	0.09 (0.48)	0.28 (1.51)	0.64 (4.25)	0.88 (9.47)	0.84 (7.97)	1.00 (−)	0.12 (0.64)	0.90 (10.66)	0.18 (0.95)	0.53 (3.20)	0.10 (0.52)	0.25 (1.33)	0.57 (3.52)	0.45 (2.60)	0.69 (4.92)	0.71 (5.07)	0.66 (4.43)	0.51 (3.02)	0.70 (5.07)	0.44 (2.52)	0.72 (5.26)	0.82 (7.30)	0.82 (7.18)
EMPtra	0.56 (3.42)	0.16 (0.84)	0.62 (4.02)	0.78 (6.30)	0.50 (2.98)	0.33 (1.79)	0.54 (3.28)	0.12 (0.64)	1.00 (−)	0.10 (0.52)	0.77 (6.11)	0.56 (3.46)	0.69 (4.81)	0.69 (4.83)	0.35 (1.90)	0.22 (1.17)	−0.37 (−2.06)	0.47 (2.74)	0.72 (5.34)	0.57 (3.51)	0.67 (4.57)	0.15 (0.78)	0.62 (3.98)	0.54 (3.27)	0.61 (3.90)
EMPfin	0.73 (5.47)	0.33 (1.76)	0.13 (0.69)	0.29 (1.56)	0.34 (1.87)	0.68 (4.70)	0.78 (6.28)	0.90 (10.66)	0.10 (0.52)	1.00 (−)	0.14 (0.73)	0.41 (2.33)	0.23 (1.18)	0.29 (1.52)	0.39 (2.13)	0.30 (1.58)	0.51 (3.05)	0.55 (3.32)	0.64 (4.21)	0.52 (3.11)	0.58 (3.68)	0.31 (1.67)	0.53 (3.19)	0.77 (6.10)	0.75 (5.83)
EMPser	0.44 (2.52)	0.03 (0.17)	0.44 (2.49)	0.69 (4.88)	0.42 (2.34)	0.54 (3.23)	0.48 (2.76)	0.18 (0.95)	0.77 (6.11)	0.14 (0.73)	1.00 (−)	0.48 (2.75)	0.31 (1.64)	0.39 (2.14)	0.24 (1.28)	0.53 (3.18)	−0.30 (−1.62)	0.40 (2.19)	0.66 (4.47)	0.40 (2.25)	0.44 (2.51)	0.04 (0.21)	0.59 (3.74)	0.46 (2.66)	0.65 (4.32)
IPIg	0.69 (6.64)	0.51 (3.00)	0.43 (2.43)	0.43 (2.43)	0.57 (3.56)	0.62 (4.08)	0.59 (3.76)	0.53 (3.20)	0.56 (3.46)	0.41 (2.33)	0.48 (2.75)	1.00 (−)	0.50 (4.05)	0.89 (13.20)	0.93 (17.17)	0.85 (11.05)	−0.40 (−3.01)	0.91 (15.68)	0.60 (5.21)	0.05 (0.38)	0.80 (9.24)	0.39 (2.90)	0.53 (4.30)	0.47 (3.72)	0.41 (3.09)
IPIen	0.51 (4.13)	−0.26 (−1.36)	0.43 (2.40)	0.61 (3.96)	0.12 (0.63)	0.04 (0.23)	0.40 (2.19)	0.10 (0.52)	0.69 (4.81)	0.23 (1.18)	0.31 (1.64)	0.50 (4.05)	1.00 (−)	0.50 (4.00)	0.35 (2.58)	0.34 (2.47)	−0.23 (−1.61)	0.50 (4.01)	0.50 (4.04)	0.48 (3.81)	0.50 (4.05)	−0.05 (−0.36)	0.44 (3.44)	0.42 (3.22)	0.41 (3.07)
IPIex	0.48 (3.76)	0.45 (2.60)	0.74 (5.58)	0.60 (3.84)	0.33 (1.77)	0.26 (1.37)	0.48 (2.81)	0.25 (1.33)	0.69 (4.83)	0.29 (1.52)	0.39 (2.14)	0.89 (13.20)	0.50 (4.00)	1.00 (−)	0.76 (7.99)	0.66 (6.14)	−0.60 (−5.20)	0.69 (6.54)	0.53 (4.37)	0.01 (0.06)	0.68 (6.40)	0.34 (2.53)	0.24 (1.68)	0.26 (1.83)	0.11 (0.79)
IPItr	0.74 (7.70)	0.71 (5.09)	0.29 (1.54)	0.24 (1.28)	0.68 (4.69)	0.60 (3.87)	0.52 (3.07)	0.57 (3.52)	0.35 (1.90)	0.39 (2.13)	0.24 (1.28)	0.93 (17.17)	0.35 (2.58)	0.76 (7.99)	1.00 (−)	0.66 (6.16)	−0.27 (−1.93)	0.91 (15.13)	0.61 (5.31)	0.07 (0.50)	0.82 (9.97)	0.45 (3.47)	0.59 (5.07)	0.56 (4.68)	0.53 (4.34)
IPIot	0.48 (3.79)	0.18 (0.92)	0.01 (0.06)	0.10 (0.50)	0.34 (1.86)	0.68 (4.67)	0.38 (2.08)	0.45 (2.60)	0.22 (1.17)	0.30 (1.58)	0.53 (3.18)	0.85 (11.05)	0.34 (2.47)	0.66 (6.14)	0.66 (6.16)	1.00 (−)	−0.28 (−2.01)	0.76 (8.12)	0.35 (2.56)	−0.11 (−0.77)	0.55 (4.60)	0.28 (1.99)	0.41 (3.08)	0.28 (2.04)	0.23 (1.64)
GVAag	0.16 (1.10)	0.40 (2.19)	−0.42 (−2.35)	−0.27 (−1.46)	0.49 (2.87)	0.54 (3.31)	0.32 (1.71)	0.69 (4.92)	−0.37 (−2.06)	0.51 (3.05)	−0.30 (−1.62)	−0.40 (−3.01)	−0.23 (−1.61)	−0.60 (−5.20)	−0.27 (−1.93)	−0.28 (−2.01)	1.00 (−)	−0.16 (−1.16)	−0.22 (−1.57)	0.16 (1.10)	−0.04 (−0.29)	0.24 (1.70)	0.15 (1.06)	0.19 (1.30)	0.34 (2.54)
GVAin	0.84 (10.69)	0.42 (2.33)	0.24 (1.27)	0.45 (2.56)	0.73 (5.46)	0.73 (5.43)	0.71 (5.10)	0.71 (5.07)	0.47 (2.74)	0.55 (3.32)	0.40 (2.19)	0.91 (15.68)	0.50 (4.01)	0.69 (6.54)	0.91 (15.13)	0.76 (8.12)	−0.16 (−1.16)	1.00 (−)	0.67 (6.19)	0.25 (1.77)	0.83 (10.30)	0.34 (2.50)	0.76 (8.08)	0.67 (6.30)	0.64 (5.75)
GVAco	0.82 (9.96)	0.26 (1.39)	0.66 (4.51)	0.89 (9.87)	0.61 (3.89)	0.70 (5.06)	0.92 (12.09)	0.66 (4.43)	0.72 (5.34)	0.64 (4.21)	0.66 (4.47)	0.60 (5.21)	0.50 (4.04)	0.53 (4.37)	0.61 (5.31)	0.35 (2.56)	−0.22 (−1.57)	0.67 (6.19)	1.00 (−)	0.67 (6.24)	0.80 (9.14)	0.20 (1.42)	0.78 (8.74)	0.81 (9.47)	0.72 (7.29)
GVAsnv	0.63 (5.57)	0.00 (0.02)	0.31 (1.67)	0.68 (4.71)	0.51 (3.02)	0.47 (2.75)	0.74 (5.67)	0.51 (3.02)	0.57 (3.51)	0.52 (3.11)	0.40 (2.25)	0.05 (0.38)	0.48 (3.81)	0.01 (0.06)	0.07 (0.50)	−0.11 (−0.77)	0.16 (1.10)	0.25 (1.77)	0.67 (6.24)	1.00 (−)	0.46 (3.57)	−0.09 (−0.65)	0.63 (5.56)	0.77 (8.33)	0.62 (5.50)
GVAsv	0.92 (16.41)	0.62 (4.04)	0.57 (3.49)	0.67 (4.64)	0.82 (7.39)	0.71 (5.19)	0.89 (10.04)	0.70 (5.07)	0.67 (4.57)	0.58 (3.68)	0.44 (2.51)	0.80 (9.24)	0.50 (4.05)	0.68 (6.40)	0.82 (9.97)	0.55 (4.60)	−0.04 (−0.29)	0.83 (10.30)	0.80 (9.14)	0.46 (3.57)	1.00 (−)	0.51 (4.11)	0.75 (7.96)	0.79 (9.03)	0.69 (6.67)
EMPa	0.42 (3.20)	0.99 (33.67)	0.39 (2.14)	0.10 (0.51)	0.55 (3.37)	0.44 (2.49)	0.34 (1.87)	0.44 (2.52)	0.15 (0.78)	0.31 (1.67)	0.04 (0.21)	0.39 (2.90)	−0.05 (−0.36)	0.34 (2.53)	0.45 (3.47)	0.28 (1.99)	0.24 (1.70)	0.34 (2.50)	0.20 (1.42)	−0.09 (−0.65)	0.51 (4.11)	1.00 (−)	0.23 (1.66)	0.20 (1.40)	0.21 (1.52)
EMPin	0.88 (12.78)	0.30 (1.61)	0.30 (1.63)	0.67 (4.66)	0.89 (9.70)	0.83 (7.71)	0.85 (8.07)	0.72 (5.26)	0.62 (3.98)	0.53 (3.19)	0.59 (3.74)	0.53 (4.30)	0.44 (3.44)	0.24 (1.68)	0.59 (5.07)	0.41 (3.08)	0.15 (1.06)	0.76 (8.08)	0.78 (8.74)	0.63 (5.56)	0.75 (7.96)	0.23 (1.66)	1.00 (−)	0.83 (10.43)	0.86 (11.93)
EMPc	0.90 (14.42)	0.27 (1.45)	0.35 (1.88)	0.66 (4.53)	0.68 (4.77)	0.78 (6.29)	0.98 (27.98)	0.82 (7.30)	0.54 (3.27)	0.77 (6.10)	0.46 (2.66)	0.47 (3.72)	0.42 (3.22)	0.26 (1.83)	0.56 (4.68)	0.28 (2.04)	0.19 (1.30)	0.67 (6.30)	0.81 (9.47)	0.77 (8.33)	0.79 (9.03)	0.20 (1.40)	0.83 (10.43)	1.00 (−)	0.89 (13.69)
EMPs	0.86 (11.53)	0.26 (1.37)	0.29 (1.54)	0.64 (4.29)	0.71 (5.20)	0.87 (8.94)	0.91 (11.44)	0.82 (7.18)	0.61 (3.90)	0.75 (5.83)	0.65 (4.32)	0.41 (3.09)	0.41 (3.07)	0.11 (0.79)	0.53 (4.34)	0.23 (1.64)	0.34 (2.54)	0.64 (5.75)	0.72 (7.29)	0.62 (5.50)	0.69 (6.67)	0.21 (1.52)	0.86 (11.93)	0.89 (13.69)	1.00 (−)

See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1970.1-1985.4. Correlations First Differences.																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.25 (2.06)	0.62 (6.21)	0.17 (1.00)	0.38 (2.43)	−0.04 (−0.27)	−0.02 (−0.14)	0.09 (0.53)	0.37 (3.07)	0.33 (2.06)	0.11 (0.85)	0.18 (1.10)	0.12 (0.94)	0.14 (1.11)	0.47 (3.18)	0.20 (1.17)	−0.23 (−1.80)	−0.10 (−0.43)	0.12 (0.48)
PA	0.25 (2.06)	1.00 (−)	0.58 (5.61)	0.26 (1.60)	0.94 (15.62)	0.08 (0.66)	0.18 (1.42)	0.07 (0.44)	0.30 (2.42)	0.46 (3.10)	−0.13 (−1.02)	−0.12 (−0.73)	−0.05 (−0.42)	−0.13 (−1.02)	−0.12 (−0.70)	0.26 (1.52)	−0.17 (−1.39)	0.28 (1.19)	0.27 (1.14)
EMP	0.62 (6.21)	0.58 (5.61)	1.00 (−)	0.41 (2.63)	0.74 (6.54)	−0.17 (−1.38)	0.16 (1.23)	0.13 (0.81)	0.62 (6.18)	0.64 (4.97)	−0.05 (−0.43)	−0.06 (−0.36)	−0.04 (−0.34)	−0.34 (−2.85)	−0.31 (−1.93)	0.35 (2.13)	−0.11 (−0.90)	−0.06 (−0.27)	0.01 (0.03)
ASPU	0.17 (1.00)	0.26 (1.60)	0.41 (2.63)	1.00 (−)	0.29 (1.82)	−0.14 (−0.86)	−0.03 (−0.20)	0.04 (0.26)	0.34 (2.12)	0.26 (1.62)	0.02 (0.11)	−0.30 (−1.85)	−0.08 (−0.49)	−0.23 (−1.40)	−0.14 (−0.81)	0.36 (2.21)	0.02 (0.09)	0.21 (0.88)	0.29 (1.27)
TA	0.38 (2.43)	0.94 (15.62)	0.74 (6.54)	0.29 (1.82)	1.00 (−)	−0.60 (−4.49)	−0.02 (−0.11)	0.04 (0.22)	0.41 (2.70)	0.47 (3.12)	−0.07 (−0.39)	−0.07 (−0.41)	−0.04 (−0.27)	−0.16 (−0.96)	−0.13 (−0.76)	0.26 (1.52)	−0.01 (−0.03)	0.24 (1.01)	0.23 (0.97)
UT	−0.04 (−0.27)	0.08 (0.66)	−0.17 (−1.38)	−0.14 (−0.86)	−0.60 (−4.49)	1.00 (−)	−0.02 (−0.16)	−0.14 (−0.82)	−0.06 (−0.49)	−0.49 (−3.30)	−0.17 (−1.36)	0.01 (0.04)	0.05 (0.38)	−0.09 (−0.68)	0.05 (0.31)	−0.41 (−2.56)	0.14 (1.09)	0.23 (0.98)	0.06 (0.24)
HWes	−0.02 (−0.14)	0.18 (1.42)	0.16 (1.23)	−0.03 (−0.20)	−0.02 (−0.11)	−0.02 (−0.16)	1.00 (−)	0.18 (1.08)	0.75 (8.82)	0.15 (0.91)	−0.60 (−5.81)	0.31 (1.90)	−0.13 (−1.00)	−0.67 (−7.14)	−0.18 (−1.07)	−0.13 (−0.75)	−0.12 (−0.98)	−0.53 (−2.57)	−0.50 (−2.37)
HWepa	0.09 (0.53)	0.07 (0.44)	0.13 (0.81)	0.04 (0.26)	0.04 (0.22)	−0.14 (−0.82)	0.18 (1.08)	1.00 (−)	0.24 (1.48)	0.83 (8.65)	−0.14 (−0.82)	−0.40 (−2.57)	0.06 (0.35)	−0.10 (−0.61)	−0.60 (−4.44)	0.08 (0.46)	−0.30 (−1.87)	−0.50 (−2.41)	−0.53 (−2.58)
HTes	0.37 (3.07)	0.30 (2.42)	0.62 (6.18)	0.34 (2.12)	0.41 (2.70)	−0.06 (−0.49)	0.75 (8.82)	0.24 (1.48)	1.00 (−)	0.53 (3.69)	−0.49 (−4.34)	0.15 (0.90)	−0.13 (−1.01)	−0.80 (−10.42)	−0.35 (−2.20)	0.14 (0.82)	−0.14 (−1.07)	−0.38 (−1.71)	−0.31 (−1.36)
HTepa	0.33 (2.06)	0.46 (3.10)	0.64 (4.97)	0.26 (1.62)	0.47 (3.12)	−0.49 (−3.30)	0.15 (0.91)	0.83 (8.65)	0.53 (3.69)	1.00 (−)	−0.17 (−1.02)	−0.34 (−2.12)	0.04 (0.22)	−0.27 (−1.64)	−0.63 (−4.76)	0.26 (1.53)	−0.17 (−1.01)	−0.36 (−1.59)	−0.34 (−1.50)
LPHes	0.11 (0.85)	−0.13 (−1.02)	−0.05 (−0.43)	0.02 (0.11)	−0.07 (−0.39)	−0.17 (−1.36)	−0.60 (−5.81)	−0.14 (−0.82)	−0.49 (−4.34)	−0.17 (−1.02)	1.00 (−)	0.07 (0.41)	0.11 (0.83)	0.53 (4.86)	0.25 (1.51)	−0.02 (−0.11)	0.05 (0.38)	0.43 (1.99)	0.40 (1.79)
LPHepa	0.18 (1.10)	−0.12 (−0.73)	−0.06 (−0.36)	−0.30 (−1.85)	−0.07 (−0.41)	0.01 (0.04)	0.31 (1.90)	−0.40 (−2.57)	0.15 (0.90)	−0.34 (−2.12)	0.07 (0.41)	1.00 (−)	−0.08 (−0.45)	−0.07 (−0.42)	0.41 (2.63)	−0.18 (−1.05)	0.11 (0.64)	−0.10 (−0.43)	−0.14 (−0.60)
UCP	0.12 (0.94)	−0.05 (−0.42)	−0.04 (−0.34)	−0.08 (−0.49)	−0.04 (−0.27)	0.05 (0.38)	−0.13 (−1.00)	0.06 (0.35)	−0.13 (−1.01)	0.04 (0.22)	0.11 (0.83)	−0.08 (−0.45)	1.00 (−)	0.20 (1.63)	−0.28 (−1.74)	0.37 (2.31)	−0.12 (−0.97)	0.11 (0.47)	0.03 (0.14)
TFes	0.14 (1.11)	−0.13 (−1.02)	−0.34 (−2.85)	−0.23 (−1.40)	−0.16 (−0.96)	−0.09 (−0.68)	−0.67 (−7.14)	−0.10 (−0.61)	−0.80 (−10.42)	−0.27 (−1.64)	0.53 (4.86)	−0.07 (−0.42)	0.20 (1.63)	1.00 (−)	0.61 (4.61)	0.02 (0.11)	−0.07 (−0.58)	0.36 (1.59)	0.39 (1.73)
TFepa	0.47 (3.18)	−0.12 (−0.70)	−0.31 (−1.93)	−0.14 (−0.81)	−0.13 (−0.76)	0.05 (0.31)	−0.18 (−1.07)	−0.60 (−4.44)	−0.35 (−2.20)	−0.63 (−4.76)	0.25 (1.51)	0.41 (2.63)	−0.28 (−1.74)	0.61 (4.61)	1.00 (−)	−0.03 (−0.16)	−0.22 (−1.36)	0.24 (1.03)	0.37 (1.66)
VAC	0.20 (1.17)	0.26 (1.52)	0.35 (2.13)	0.36 (2.21)	0.26 (1.52)	−0.41 (−2.56)	−0.13 (−0.75)	0.08 (0.46)	0.14 (0.82)	0.26 (1.53)	−0.02 (−0.11)	−0.18 (−1.05)	0.37 (2.31)	0.02 (0.11)	−0.03 (−0.16)	1.00 (−)	−0.30 (−1.83)	0.19 (0.79)	0.45 (2.08)
ICLU	−0.23 (−1.80)	−0.17 (−1.39)	−0.11 (−0.90)	0.02 (0.09)	−0.01 (−0.03)	0.14 (1.09)	−0.12 (−0.98)	−0.30 (−1.87)	−0.14 (−1.07)	−0.17 (−1.01)	0.05 (0.38)	0.11 (0.64)	−0.12 (−0.97)	−0.07 (−0.58)	−0.22 (−1.36)	−0.30 (−1.83)	1.00 (−)	0.39 (1.73)	0.01 (0.05)
GANH	−0.10 (−0.43)	0.28 (1.19)	−0.06 (−0.27)	0.21 (0.88)	0.24 (1.01)	0.23 (0.98)	−0.53 (−2.57)	−0.50 (−2.41)	−0.38 (−1.71)	−0.36 (−1.59)	0.43 (1.99)	−0.10 (−0.43)	0.11 (0.47)	0.36 (1.59)	0.24 (1.03)	0.19 (0.79)	0.39 (1.73)	1.00 (−)	0.87 (7.23)
GANHR	0.12 (0.48)	0.27 (1.14)	0.01 (0.03)	0.29 (1.27)	0.23 (0.97)	0.06 (0.24)	−0.50 (−2.37)	−0.53 (−2.58)	−0.31 (−1.36)	−0.34 (−1.50)	0.40 (1.79)	−0.14 (−0.60)	0.03 (0.14)	0.39 (1.73)	0.37 (1.66)	0.45 (2.08)	0.01 (0.05)	0.87 (7.23)	1.00 (−)

Table 38: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1970.1-1985.4. Correlations Hodrick-Prescott																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.78 (9.68)	0.68 (7.40)	0.20 (1.20)	0.79 (7.82)	0.23 (1.88)	0.16 (1.25)	0.18 (1.12)	0.32 (2.69)	0.65 (5.08)	0.18 (1.42)	0.14 (0.83)	0.40 (3.47)	0.58 (5.54)	0.02 (0.14)	0.07 (0.40)	−0.23 (−1.90)	0.23 (1.02)	0.20 (0.86)
PA	0.78 (9.68)	1.00 (−)	0.79 (10.10)	0.27 (1.67)	0.81 (8.27)	0.05 (0.38)	0.26 (2.14)	0.24 (1.48)	0.41 (3.53)	0.72 (6.19)	0.01 (0.11)	−0.13 (−0.81)	0.22 (1.74)	0.32 (2.64)	−0.50 (−3.48)	−0.12 (−0.71)	−0.25 (−2.03)	0.20 (0.88)	0.10 (0.43)
EMP	0.68 (7.40)	0.79 (10.10)	1.00 (−)	0.34 (2.16)	0.81 (8.26)	−0.22 (−1.78)	0.30 (2.47)	0.31 (1.92)	0.75 (8.86)	0.89 (11.98)	−0.18 (−1.44)	−0.16 (−0.99)	0.20 (1.62)	−0.02 (−0.17)	−0.54 (−3.84)	0.01 (0.08)	−0.02 (−0.15)	−0.08 (−0.35)	−0.11 (−0.47)
ASPU	0.20 (1.20)	0.27 (1.67)	0.34 (2.16)	1.00 (−)	0.19 (1.17)	−0.27 (−1.71)	0.21 (1.29)	0.23 (1.40)	0.36 (2.35)	0.35 (2.25)	−0.27 (−1.68)	−0.35 (−2.25)	−0.09 (−0.55)	−0.33 (−2.10)	−0.31 (−1.93)	0.34 (2.10)	0.02 (0.10)	0.17 (0.75)	0.23 (1.01)
TA	0.79 (7.82)	0.81 (8.27)	0.81 (8.26)	0.19 (1.17)	1.00 (−)	−0.91 (−13.25)	−0.07 (−0.43)	0.19 (1.17)	0.62 (4.72)	0.73 (6.35)	−0.20 (−1.23)	0.03 (0.17)	0.37 (2.36)	−0.34 (−2.15)	−0.28 (−1.73)	0.06 (0.35)	0.84 (9.45)	0.27 (1.20)	0.16 (0.69)
UT	0.23 (1.88)	0.05 (0.38)	−0.22 (−1.78)	−0.27 (−1.71)	−0.91 (−13.25)	1.00 (−)	0.08 (0.65)	−0.13 (−0.80)	−0.21 (−1.71)	−0.72 (−6.21)	0.00 (0.01)	−0.04 (−0.26)	0.20 (1.57)	0.23 (1.82)	0.31 (1.99)	−0.22 (−1.32)	−0.26 (−2.10)	−0.20 (−0.86)	−0.11 (−0.47)
HWes	0.16 (1.25)	0.26 (2.14)	0.30 (2.47)	0.21 (1.29)	−0.07 (−0.43)	0.08 (0.65)	1.00 (−)	0.39 (2.57)	0.66 (6.84)	0.33 (2.13)	−0.58 (−5.68)	−0.13 (−0.76)	0.03 (0.26)	−0.45 (−3.92)	−0.55 (−4.00)	−0.34 (−2.10)	−0.32 (−2.65)	−0.58 (−2.98)	−0.45 (−2.15)
HWepa	0.18 (1.12)	0.24 (1.48)	0.31 (1.92)	0.23 (1.40)	0.19 (1.17)	−0.13 (−0.80)	0.39 (2.57)	1.00 (−)	0.51 (3.56)	0.69 (5.74)	−0.36 (−2.29)	−0.62 (−4.78)	0.29 (1.85)	−0.51 (−3.59)	−0.77 (−7.15)	−0.36 (−2.22)	−0.02 (−0.12)	−0.49 (−2.36)	−0.50 (−2.43)
HTes	0.32 (2.69)	0.41 (3.53)	0.75 (8.86)	0.36 (2.35)	0.62 (4.72)	−0.21 (−1.71)	0.66 (6.84)	0.51 (3.56)	1.00 (−)	0.90 (12.21)	−0.58 (−5.61)	−0.23 (−1.39)	0.17 (1.32)	−0.54 (−5.06)	−0.68 (−5.58)	−0.14 (−0.84)	−0.12 (−0.92)	−0.37 (−1.68)	−0.31 (−1.39)
HTepa	0.65 (5.08)	0.72 (6.19)	0.89 (11.98)	0.35 (2.25)	0.73 (6.35)	−0.72 (−6.21)	0.33 (2.13)	0.69 (5.74)	0.90 (12.21)	1.00 (−)	−0.50 (−3.48)	−0.39 (−2.53)	0.39 (2.53)	−0.73 (−6.34)	−0.73 (−6.50)	−0.13 (−0.79)	0.45 (3.04)	−0.27 (−1.18)	−0.29 (−1.30)
LPHes	0.18 (1.42)	0.01 (0.11)	−0.18 (−1.44)	−0.27 (−1.68)	−0.20 (−1.23)	0.00 (0.01)	−0.58 (−5.68)	−0.36 (−2.29)	−0.58 (−5.61)	−0.50 (−3.48)	1.00 (−)	0.28 (1.75)	0.07 (0.59)	0.69 (7.55)	0.58 (4.29)	−0.05 (−0.30)	0.06 (0.47)	0.48 (2.32)	0.41 (1.90)
LPHepa	0.14 (0.83)	−0.13 (−0.81)	−0.16 (−0.99)	−0.35 (−2.25)	0.03 (0.17)	−0.04 (−0.26)	−0.13 (−0.76)	−0.62 (−4.78)	−0.23 (−1.39)	−0.39 (−2.53)	0.28 (1.75)	1.00 (−)	−0.12 (−0.72)	0.33 (2.13)	0.61 (4.65)	0.06 (0.35)	0.13 (0.77)	0.24 (1.05)	0.24 (1.06)
UCP	0.40 (3.47)	0.22 (1.74)	0.20 (1.62)	−0.09 (−0.55)	0.37 (2.36)	0.20 (1.57)	0.03 (0.26)	0.29 (1.85)	0.17 (1.32)	0.39 (2.53)	0.07 (0.59)	−0.12 (−0.72)	1.00 (−)	0.30 (2.51)	−0.42 (−2.80)	−0.13 (−0.76)	−0.30 (−2.48)	−0.13 (−0.54)	−0.25 (−1.10)
TFes	0.58 (5.54)	0.32 (2.64)	−0.02 (−0.17)	−0.33 (−2.10)	−0.34 (−2.15)	0.23 (1.82)	−0.45 (−3.92)	−0.51 (−3.59)	−0.54 (−5.06)	−0.73 (−6.34)	0.69 (7.55)	0.33 (2.13)	0.30 (2.51)	1.00 (−)	0.83 (8.99)	0.24 (1.41)	−0.15 (−1.17)	0.48 (2.30)	0.41 (1.92)
TFepa	0.02 (0.14)	−0.50 (−3.48)	−0.54 (−3.84)	−0.31 (−1.93)	−0.28 (−1.73)	0.31 (1.99)	−0.55 (−4.00)	−0.77 (−7.15)	−0.68 (−5.58)	−0.73 (−6.50)	0.58 (4.29)	0.61 (4.65)	−0.42 (−2.80)	0.83 (8.99)	1.00 (−)	0.32 (1.95)	0.03 (0.20)	0.39 (1.81)	0.43 (2.01)
VAC	0.07 (0.40)	−0.12 (−0.71)	0.01 (0.08)	0.34 (2.10)	0.06 (0.35)	−0.22 (−1.32)	−0.34 (−2.10)	−0.36 (−2.22)	−0.14 (−0.84)	−0.13 (−0.79)	−0.05 (−0.30)	0.06 (0.35)	−0.13 (−0.76)	0.24 (1.41)	0.32 (1.95)	1.00 (−)	0.14 (0.80)	0.38 (1.73)	0.45 (2.13)
ICLU	−0.23 (−1.90)	−0.25 (−2.03)	−0.02 (−0.15)	0.02 (0.10)	0.84 (9.45)	−0.26 (−2.10)	−0.32 (−2.65)	−0.02 (−0.12)	−0.12 (−0.92)	0.45 (3.04)	0.06 (0.47)	0.13 (0.77)	−0.30 (−2.48)	−0.15 (−1.17)	0.03 (0.20)	0.14 (0.80)	1.00 (−)	0.42 (1.95)	0.14 (0.59)
GANH	0.23 (1.02)	0.20 (0.88)	−0.08 (−0.35)	0.17 (0.75)	0.27 (1.20)	−0.20 (−0.86)	−0.58 (−2.98)	−0.49 (−2.36)	−0.37 (−1.68)	−0.27 (−1.18)	0.48 (2.32)	0.24 (1.05)	−0.13 (−0.54)	0.48 (2.30)	0.39 (1.81)	0.38 (1.73)	0.42 (1.95)	1.00 (−)	0.92 (9.77)
GANHR	0.20 (0.86)	0.10 (0.43)	−0.11 (−0.47)	0.23 (1.01)	0.16 (0.69)	−0.11 (−0.47)	−0.45 (−2.15)	−0.50 (−2.43)	−0.31 (−1.39)	−0.29 (−1.30)	0.41 (1.90)	0.24 (1.06)	−0.25 (−1.10)	0.41 (1.92)	0.43 (2.01)	0.45 (2.13)	0.14 (0.59)	0.92 (9.77)	1.00 (−)

Table 39: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1970.1-1985.4. Correlations Baxter-King																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.81 (10.97)	0.69 (7.40)	0.19 (1.16)	0.81 (8.36)	0.18 (1.46)	0.15 (1.21)	0.17 (1.06)	0.39 (3.33)	0.67 (5.48)	0.24 (1.97)	0.12 (0.71)	0.44 (3.81)	0.48 (4.33)	−0.08 (−0.46)	0.12 (0.70)	−0.17 (−1.37)	0.09 (0.37)	0.03 (0.14)
PA	0.81 (10.97)	1.00 (−)	0.84 (11.98)	0.27 (1.68)	0.89 (11.44)	−0.17 (−1.36)	0.30 (2.50)	0.30 (1.89)	0.50 (4.57)	0.75 (6.84)	0.07 (0.54)	−0.50 (−3.47)	0.30 (2.50)	0.27 (2.21)	−0.50 (−3.46)	−0.02 (−0.10)	−0.31 (−2.57)	0.14 (0.58)	−0.07 (−0.28)
EMP	0.69 (7.40)	0.84 (11.98)	1.00 (−)	0.37 (2.37)	0.88 (10.94)	−0.40 (−3.47)	0.41 (3.50)	0.32 (2.03)	0.83 (11.50)	0.90 (12.33)	−0.34 (−2.87)	−0.44 (−2.96)	0.22 (1.82)	−0.15 (−1.18)	−0.59 (−4.37)	0.07 (0.39)	−0.18 (−1.46)	−0.18 (−0.80)	−0.24 (−1.04)
ASPU	0.19 (1.16)	0.27 (1.68)	0.37 (2.37)	1.00 (−)	0.20 (1.22)	−0.27 (−1.66)	0.27 (1.67)	0.34 (2.14)	0.39 (2.56)	0.43 (2.84)	−0.40 (−2.59)	−0.42 (−2.76)	−0.17 (−1.03)	−0.36 (−2.28)	−0.39 (−2.52)	0.36 (2.26)	0.05 (0.31)	0.29 (1.29)	0.35 (1.60)
TA	0.81 (8.36)	0.89 (11.44)	0.88 (10.94)	0.20 (1.22)	1.00 (−)	−0.91 (−13.12)	0.04 (0.25)	0.30 (1.86)	0.74 (6.51)	0.80 (8.07)	−0.53 (−3.80)	−0.21 (−1.30)	0.56 (4.03)	−0.46 (−3.14)	−0.40 (−2.63)	0.03 (0.16)	0.80 (8.05)	0.14 (0.62)	−0.06 (−0.27)
UT	0.18 (1.46)	−0.17 (−1.36)	−0.40 (−3.47)	−0.27 (−1.66)	−0.91 (−13.12)	1.00 (−)	−0.13 (−1.00)	−0.13 (−0.80)	−0.41 (−3.58)	−0.72 (−6.30)	0.33 (2.73)	0.12 (0.71)	0.14 (1.09)	0.40 (3.45)	0.36 (2.29)	−0.25 (−1.51)	0.19 (1.48)	−0.24 (−1.05)	−0.15 (−0.65)
HWes	0.15 (1.21)	0.30 (2.50)	0.41 (3.50)	0.27 (1.67)	0.04 (0.25)	−0.13 (−1.00)	1.00 (−)	0.36 (2.35)	0.68 (7.29)	0.37 (2.42)	−0.61 (−6.13)	−0.51 (−3.58)	0.07 (0.56)	−0.50 (−4.55)	−0.65 (−5.19)	−0.38 (−2.40)	−0.41 (−3.53)	−0.60 (−3.22)	−0.37 (−1.71)
HWepa	0.17 (1.06)	0.30 (1.89)	0.32 (2.03)	0.34 (2.14)	0.30 (1.86)	−0.13 (−0.80)	0.36 (2.35)	1.00 (−)	0.50 (3.49)	0.70 (5.83)	−0.54 (−3.86)	−0.66 (−5.22)	0.36 (2.33)	−0.51 (−3.57)	−0.75 (−6.75)	−0.34 (−2.14)	0.16 (0.96)	−0.45 (−2.17)	−0.56 (−2.89)
HTes	0.39 (3.33)	0.50 (4.57)	0.83 (11.50)	0.39 (2.56)	0.74 (6.51)	−0.41 (−3.58)	0.68 (7.29)	0.50 (3.49)	1.00 (−)	0.92 (13.88)	−0.75 (−8.97)	−0.49 (−3.40)	0.17 (1.39)	−0.58 (−5.60)	−0.74 (−6.56)	−0.11 (−0.66)	−0.29 (−2.37)	−0.48 (−2.29)	−0.41 (−1.92)
HTepa	0.67 (5.48)	0.75 (6.84)	0.90 (12.33)	0.43 (2.84)	0.80 (8.07)	−0.72 (−6.30)	0.37 (2.42)	0.70 (5.83)	0.92 (13.88)	1.00 (−)	−0.82 (−8.71)	−0.61 (−4.56)	0.47 (3.23)	−0.77 (−7.16)	−0.78 (−7.44)	−0.10 (−0.59)	0.62 (4.69)	−0.33 (−1.47)	−0.41 (−1.91)
LPHes	0.24 (1.97)	0.07 (0.54)	−0.34 (−2.87)	−0.40 (−2.59)	−0.53 (−3.80)	0.33 (2.73)	−0.61 (−6.13)	−0.54 (−3.86)	−0.75 (−8.97)	−0.82 (−8.71)	1.00 (−)	0.66 (5.31)	0.19 (1.50)	0.95 (25.09)	0.88 (10.87)	0.19 (1.13)	0.08 (0.64)	0.55 (2.78)	0.47 (2.25)
LPHepa	0.12 (0.71)	−0.50 (−3.47)	−0.44 (−2.96)	−0.42 (−2.76)	−0.21 (−1.30)	0.12 (0.71)	−0.51 (−3.58)	−0.66 (−5.22)	−0.49 (−3.40)	−0.61 (−4.56)	0.66 (5.31)	1.00 (−)	−0.04 (−0.22)	0.66 (5.31)	0.87 (10.78)	0.18 (1.07)	−0.24 (−1.51)	0.41 (1.90)	0.49 (2.41)
UCP	0.44 (3.81)	0.30 (2.50)	0.22 (1.82)	−0.17 (−1.03)	0.56 (4.03)	0.14 (1.09)	0.07 (0.56)	0.36 (2.33)	0.17 (1.39)	0.47 (3.23)	0.19 (1.50)	−0.04 (−0.22)	1.00 (−)	0.34 (2.89)	−0.43 (−2.86)	−0.35 (−2.21)	−0.28 (−2.26)	−0.37 (−1.70)	−0.70 (−4.19)
TFes	0.48 (4.33)	0.27 (2.21)	−0.15 (−1.18)	−0.36 (−2.28)	−0.46 (−3.14)	0.40 (3.45)	−0.50 (−4.55)	−0.51 (−3.57)	−0.58 (−5.60)	−0.77 (−7.16)	0.95 (25.09)	0.66 (5.31)	0.34 (2.89)	1.00 (−)	0.88 (11.36)	0.22 (1.34)	0.03 (0.23)	0.59 (3.10)	0.51 (2.52)
TFepa	−0.08 (−0.46)	−0.50 (−3.46)	−0.59 (−4.37)	−0.39 (−2.52)	−0.40 (−2.63)	0.36 (2.29)	−0.65 (−5.19)	−0.75 (−6.75)	−0.74 (−6.56)	−0.78 (−7.44)	0.88 (10.87)	0.87 (10.78)	−0.43 (−2.86)	0.88 (11.36)	1.00 (−)	0.27 (1.62)	−0.30 (−1.86)	0.48 (2.34)	0.56 (2.84)
VAC	0.12 (0.70)	−0.02 (−0.10)	0.07 (0.39)	0.36 (2.26)	0.03 (0.16)	−0.25 (−1.51)	−0.38 (−2.40)	−0.34 (−2.14)	−0.11 (−0.66)	−0.10 (−0.59)	0.19 (1.13)	0.18 (1.07)	−0.35 (−2.21)	0.22 (1.34)	0.27 (1.62)	1.00 (−)	−0.08 (−0.47)	0.67 (3.83)	0.73 (4.50)
ICLU	−0.17 (−1.37)	−0.31 (−2.57)	−0.18 (−1.46)	0.05 (0.31)	0.80 (8.05)	0.19 (1.48)	−0.41 (−3.53)	0.16 (0.96)	−0.29 (−2.37)	0.62 (4.69)	0.08 (0.64)	−0.24 (−1.51)	−0.28 (−2.26)	0.03 (0.23)	−0.30 (−1.86)	−0.08 (−0.47)	1.00 (−)	0.00 (−0.01)	−0.37 (−1.69)
GANH	0.09 (0.37)	0.14 (0.58)	−0.18 (−0.80)	0.29 (1.29)	0.14 (0.62)	−0.24 (−1.05)	−0.60 (−3.22)	−0.45 (−2.17)	−0.48 (−2.29)	−0.33 (−1.47)	0.55 (2.78)	0.41 (1.90)	−0.37 (−1.70)	0.59 (3.10)	0.48 (2.34)	0.67 (3.83)	0.00 (−0.01)	1.00 (−)	0.88 (7.76)
GANHR	0.03 (0.14)	−0.07 (−0.28)	−0.24 (−1.04)	0.35 (1.60)	−0.06 (−0.27)	−0.15 (−0.65)	−0.37 (−1.71)	−0.56 (−2.89)	−0.41 (−1.92)	−0.41 (−1.91)	0.47 (2.25)	0.49 (2.41)	−0.70 (−4.19)	0.51 (2.52)	0.56 (2.84)	0.73 (4.50)	−0.37 (−1.69)	0.88 (7.76)	1.00 (−)

Table 40: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1986.1-1998.2. Correlations First Differences																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.31 (2.22)	0.81 (9.41)	0.13 (0.93)	0.17 (1.18)	−0.76 (−8.10)	−0.01 (−0.04)	−0.04 (−0.29)	0.54 (4.50)	0.68 (6.34)	−0.05 (−0.37)	−0.03 (−0.19)	0.27 (1.96)	0.06 (0.42)	0.39 (2.97)	0.15 (1.00)	−0.08 (−0.57)	−0.02 (−0.11)	−0.06 (−0.40)
PA	0.31 (2.22)	1.00 (−)	0.34 (2.53)	0.04 (0.26)	0.94 (19.46)	−0.04 (−0.28)	0.25 (1.81)	0.02 (0.12)	0.40 (3.02)	0.24 (1.74)	−0.13 (−0.94)	−0.17 (−1.17)	0.03 (0.22)	−0.23 (−1.63)	0.13 (0.89)	0.06 (0.41)	0.15 (1.09)	−0.05 (−0.35)	−0.08 (−0.56)
EMP	0.81 (9.41)	0.34 (2.53)	1.00 (−)	0.35 (2.62)	0.29 (2.11)	−0.94 (−19.43)	−0.01 (−0.07)	0.00 (−0.02)	0.68 (6.36)	0.86 (11.88)	−0.25 (−1.81)	−0.05 (−0.34)	0.26 (1.86)	−0.22 (−1.59)	−0.06 (−0.40)	0.34 (2.48)	−0.05 (−0.34)	−0.12 (−0.86)	−0.13 (−0.89)
ASPU	0.13 (0.93)	0.04 (0.26)	0.35 (2.62)	1.00 (−)	0.02 (0.13)	−0.39 (−2.90)	−0.09 (−0.65)	−0.05 (−0.36)	0.25 (1.82)	0.26 (1.89)	−0.24 (−1.73)	−0.03 (−0.24)	0.16 (1.10)	−0.25 (−1.78)	−0.23 (−1.65)	0.04 (0.29)	0.17 (1.23)	−0.04 (−0.31)	−0.16 (−1.10)
TA	0.17 (1.18)	0.94 (19.46)	0.29 (2.11)	0.02 (0.13)	1.00 (−)	−0.02 (−0.11)	0.26 (1.90)	0.12 (0.83)	0.37 (2.79)	0.25 (1.76)	−0.16 (−1.14)	−0.20 (−1.42)	−0.02 (−0.16)	−0.29 (−2.12)	−0.04 (−0.25)	0.05 (0.37)	0.15 (1.03)	−0.09 (−0.60)	−0.10 (−0.68)
UT	−0.76 (−8.10)	−0.04 (−0.28)	−0.94 (−19.43)	−0.39 (−2.90)	−0.02 (−0.11)	1.00 (−)	0.10 (0.70)	−0.03 (−0.24)	−0.59 (−5.01)	−0.85 (−11.17)	0.22 (1.59)	0.02 (0.13)	−0.25 (−1.77)	0.16 (1.14)	0.12 (0.84)	−0.34 (−2.41)	0.10 (0.70)	0.10 (0.72)	0.11 (0.76)
HWes	−0.01 (−0.04)	0.25 (1.81)	−0.01 (−0.07)	−0.09 (−0.65)	0.26 (1.90)	0.10 (0.70)	1.00 (−)	0.02 (0.11)	0.68 (6.37)	−0.04 (−0.29)	−0.42 (−3.19)	−0.29 (−2.11)	0.06 (0.43)	−0.81 (−9.43)	0.06 (0.41)	−0.01 (−0.04)	−0.02 (−0.15)	−0.56 (−4.74)	−0.60 (−5.21)
HWepa	−0.04 (−0.29)	0.02 (0.12)	0.00 (−0.02)	−0.05 (−0.36)	0.12 (0.83)	−0.03 (−0.24)	0.02 (0.11)	1.00 (−)	0.05 (0.36)	0.47 (3.69)	−0.03 (−0.18)	−0.39 (−2.97)	−0.22 (−1.59)	−0.09 (−0.64)	−0.63 (−5.59)	0.00 (−0.01)	−0.02 (−0.12)	−0.12 (−0.87)	−0.08 (−0.57)
HTes	0.54 (4.50)	0.40 (3.02)	0.68 (6.36)	0.25 (1.82)	0.37 (2.79)	−0.59 (−5.01)	0.68 (6.37)	0.05 (0.36)	1.00 (−)	0.59 (5.09)	−0.49 (−3.93)	−0.21 (−1.45)	0.22 (1.58)	−0.79 (−9.07)	−0.04 (−0.26)	0.17 (1.15)	−0.03 (−0.23)	−0.45 (−3.53)	−0.50 (−3.96)
HTepa	0.68 (6.34)	0.24 (1.74)	0.86 (11.88)	0.26 (1.89)	0.25 (1.76)	−0.85 (−11.17)	−0.04 (−0.29)	0.47 (3.69)	0.59 (5.09)	1.00 (−)	−0.21 (−1.49)	−0.23 (−1.61)	0.11 (0.76)	−0.22 (−1.53)	−0.39 (−2.90)	0.31 (2.24)	−0.07 (−0.47)	−0.11 (−0.73)	−0.08 (−0.58)
LPHes	−0.05 (−0.37)	−0.13 (−0.94)	−0.25 (−1.81)	−0.24 (−1.73)	−0.16 (−1.14)	0.22 (1.59)	−0.42 (−3.19)	−0.03 (−0.18)	−0.49 (−3.93)	−0.21 (−1.49)	1.00 (−)	0.29 (2.07)	−0.27 (−1.92)	0.55 (4.57)	0.19 (1.34)	0.18 (1.24)	0.01 (0.08)	0.52 (4.17)	0.50 (4.00)
LPHepa	−0.03 (−0.19)	−0.17 (−1.17)	−0.05 (−0.34)	−0.03 (−0.24)	−0.20 (−1.42)	0.02 (0.13)	−0.29 (−2.11)	−0.39 (−2.97)	−0.21 (−1.45)	−0.23 (−1.61)	0.29 (2.07)	1.00 (−)	0.09 (0.61)	0.23 (1.63)	0.25 (1.79)	0.01 (0.08)	−0.07 (−0.46)	0.04 (0.25)	0.07 (0.49)
UCP	0.27 (1.96)	0.03 (0.22)	0.26 (1.86)	0.16 (1.10)	−0.02 (−0.16)	−0.25 (−1.77)	0.06 (0.43)	−0.22 (−1.59)	0.22 (1.58)	0.11 (0.76)	−0.27 (−1.92)	0.09 (0.61)	1.00 (−)	−0.03 (−0.17)	0.28 (2.01)	−0.15 (−1.05)	−0.50 (−4.03)	−0.20 (−1.41)	−0.15 (−1.03)
TFes	0.06 (0.42)	−0.23 (−1.63)	−0.22 (−1.59)	−0.25 (−1.78)	−0.29 (−2.12)	0.16 (1.14)	−0.81 (−9.43)	−0.09 (−0.64)	−0.79 (−9.07)	−0.22 (−1.53)	0.55 (4.57)	0.23 (1.63)	−0.03 (−0.17)	1.00 (−)	0.35 (2.59)	−0.07 (−0.50)	−0.12 (−0.87)	0.51 (4.09)	0.55 (4.54)
TFepa	0.39 (2.97)	0.13 (0.89)	−0.06 (−0.40)	−0.23 (−1.65)	−0.04 (−0.25)	0.12 (0.84)	0.06 (0.41)	−0.63 (−5.59)	−0.04 (−0.26)	−0.39 (−2.90)	0.19 (1.34)	0.25 (1.79)	0.28 (2.01)	0.35 (2.59)	1.00 (−)	−0.17 (−1.14)	−0.20 (−1.40)	0.07 (0.48)	0.02 (0.16)
VAC	0.15 (1.00)	0.06 (0.41)	0.34 (2.48)	0.04 (0.29)	0.05 (0.37)	−0.34 (−2.41)	−0.01 (−0.04)	0.00 (−0.01)	0.17 (1.15)	0.31 (2.24)	0.18 (1.24)	0.01 (0.08)	−0.15 (−1.05)	−0.07 (−0.50)	−0.17 (−1.14)	1.00 (−)	−0.07 (−0.47)	−0.08 (−0.53)	−0.03 (−0.21)
ICLU	−0.08 (−0.57)	0.15 (1.09)	−0.05 (−0.34)	0.17 (1.23)	0.15 (1.03)	0.10 (0.70)	−0.02 (−0.15)	−0.02 (−0.12)	−0.03 (−0.23)	−0.07 (−0.47)	0.01 (0.08)	−0.07 (−0.46)	−0.50 (−4.03)	−0.12 (−0.87)	−0.20 (−1.40)	−0.07 (−0.47)	1.00 (−)	0.26 (1.87)	0.15 (1.04)
GANH	−0.02 (−0.11)	−0.05 (−0.35)	−0.12 (−0.86)	−0.04 (−0.31)	−0.09 (−0.60)	0.10 (0.72)	−0.56 (−4.74)	−0.12 (−0.87)	−0.45 (−3.53)	−0.11 (−0.73)	0.52 (4.17)	0.04 (0.25)	−0.20 (−1.41)	0.51 (4.09)	0.07 (0.48)	−0.08 (−0.53)	0.26 (1.87)	1.00 (−)	0.91 (15.49)
GANHR	−0.06 (−0.40)	−0.08 (−0.56)	−0.13 (−0.89)	−0.16 (−1.10)	−0.10 (−0.68)	0.11 (0.76)	−0.60 (−5.21)	−0.08 (−0.57)	−0.50 (−3.96)	−0.08 (−0.58)	0.50 (4.00)	0.07 (0.49)	−0.15 (−1.03)	0.55 (4.54)	0.02 (0.16)	−0.03 (−0.21)	0.15 (1.04)	0.91 (15.49)	1.00 (−)

Table 41: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1986.1-1998.2. Correlations Hodrick-Prescott																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.51 (4.13)	0.93 (18.25)	0.28 (2.01)	0.43 (3.27)	−0.90 (−13.93)	−0.15 (−1.02)	−0.01 (−0.10)	0.88 (13.15)	0.91 (14.89)	−0.55 (−4.57)	−0.26 (−1.89)	0.56 (4.65)	−0.22 (−1.56)	0.09 (0.60)	0.44 (3.36)	−0.26 (−1.85)	−0.46 (−3.58)	−0.18 (−1.29)
PA	0.51 (4.13)	1.00 (−)	0.49 (3.89)	−0.01 (−0.07)	0.94 (19.58)	−0.30 (−2.20)	0.06 (0.39)	−0.21 (−1.49)	0.49 (3.86)	0.42 (3.22)	−0.31 (−2.22)	−0.20 (−1.39)	0.28 (1.99)	−0.04 (−0.26)	0.29 (2.08)	0.43 (3.25)	−0.29 (−2.09)	−0.46 (−3.59)	−0.07 (−0.51)
EMP	0.93 (18.25)	0.49 (3.89)	1.00 (−)	0.52 (4.26)	0.45 (3.49)	−0.97 (−29.46)	−0.20 (−1.45)	0.02 (0.14)	0.94 (19.11)	0.98 (32.94)	−0.71 (−7.00)	−0.33 (−2.42)	0.40 (3.05)	−0.45 (−3.53)	−0.20 (−1.39)	0.56 (4.60)	−0.08 (−0.54)	−0.31 (−2.27)	−0.14 (−0.99)
ASPU	0.28 (2.01)	−0.01 (−0.07)	0.52 (4.26)	1.00 (−)	0.03 (0.20)	−0.59 (−5.00)	−0.27 (−1.91)	0.11 (0.79)	0.47 (3.73)	0.54 (4.50)	−0.61 (−5.35)	−0.42 (−3.25)	0.04 (0.30)	−0.59 (−5.00)	−0.62 (−5.42)	0.48 (3.68)	0.24 (1.74)	0.31 (2.24)	−0.07 (−0.46)
TA	0.43 (3.27)	0.94 (19.58)	0.45 (3.49)	0.03 (0.20)	1.00 (−)	−0.28 (−2.02)	0.09 (0.65)	−0.16 (−1.11)	0.47 (3.66)	0.39 (2.92)	−0.35 (−2.55)	−0.18 (−1.24)	0.11 (0.76)	−0.14 (−0.97)	0.18 (1.28)	0.37 (2.72)	−0.12 (−0.86)	−0.31 (−2.29)	0.01 (0.05)
UT	−0.90 (−13.93)	−0.30 (−2.20)	−0.97 (−29.46)	−0.59 (−5.00)	−0.28 (−2.02)	1.00 (−)	0.23 (1.65)	−0.12 (−0.84)	−0.92 (−16.30)	−0.98 (−31.51)	0.71 (6.93)	0.33 (2.38)	−0.41 (−3.08)	0.51 (4.11)	0.31 (2.22)	−0.51 (−4.00)	0.03 (0.17)	0.23 (1.66)	0.16 (1.13)
HWes	−0.15 (−1.02)	0.06 (0.39)	−0.20 (−1.45)	−0.27 (−1.91)	0.09 (0.65)	0.23 (1.65)	1.00 (−)	−0.11 (−0.77)	0.11 (0.74)	−0.23 (−1.61)	−0.08 (−0.55)	−0.03 (−0.24)	0.14 (1.00)	−0.33 (−2.41)	0.25 (1.82)	−0.08 (−0.55)	−0.21 (−1.50)	−0.38 (−2.84)	−0.41 (−3.14)
HWepa	−0.01 (−0.10)	−0.21 (−1.49)	0.02 (0.14)	0.11 (0.79)	−0.16 (−1.11)	−0.12 (−0.84)	−0.11 (−0.77)	1.00 (−)	0.05 (0.36)	0.22 (1.55)	0.00 (−0.02)	−0.27 (−1.97)	0.01 (0.07)	−0.18 (−1.30)	−0.50 (−3.99)	−0.11 (−0.77)	0.11 (0.79)	0.08 (0.53)	−0.01 (−0.09)
HTes	0.88 (13.15)	0.49 (3.86)	0.94 (19.11)	0.47 (3.73)	0.47 (3.66)	−0.92 (−16.30)	0.11 (0.74)	0.05 (0.36)	1.00 (−)	0.93 (17.17)	−0.78 (−8.67)	−0.35 (−2.59)	0.48 (3.81)	−0.61 (−5.37)	−0.16 (−1.12)	0.52 (4.17)	−0.15 (−1.05)	−0.43 (−3.35)	−0.30 (−2.15)
HTepa	0.91 (14.89)	0.42 (3.22)	0.98 (32.94)	0.54 (4.50)	0.39 (2.92)	−0.98 (−31.51)	−0.23 (−1.61)	0.22 (1.55)	0.93 (17.17)	1.00 (−)	−0.70 (−6.74)	−0.38 (−2.85)	0.40 (3.05)	−0.48 (−3.83)	−0.30 (−2.18)	0.53 (4.21)	−0.06 (−0.39)	−0.28 (−1.99)	−0.13 (−0.94)
LPHes	−0.55 (−4.57)	−0.31 (−2.22)	−0.71 (−7.00)	−0.61 (−5.35)	−0.35 (−2.55)	0.71 (6.93)	−0.08 (−0.55)	0.00 (−0.02)	−0.78 (−8.67)	−0.70 (−6.74)	1.00 (−)	0.42 (3.22)	−0.30 (−2.19)	0.67 (6.31)	0.31 (2.23)	−0.41 (−3.09)	0.02 (0.17)	0.22 (1.53)	0.24 (1.72)
LPHepa	−0.26 (−1.89)	−0.20 (−1.39)	−0.33 (−2.42)	−0.42 (−3.25)	−0.18 (−1.24)	0.33 (2.38)	−0.03 (−0.24)	−0.27 (−1.97)	−0.35 (−2.59)	−0.38 (−2.85)	0.42 (3.22)	1.00 (−)	−0.12 (−0.83)	0.31 (2.22)	0.26 (1.89)	−0.17 (−1.20)	−0.03 (−0.21)	−0.04 (−0.26)	0.01 (0.06)
UCP	0.56 (4.65)	0.28 (1.99)	0.40 (3.05)	0.04 (0.30)	0.11 (0.76)	−0.41 (−3.08)	0.14 (1.00)	0.01 (0.07)	0.48 (3.81)	0.40 (3.05)	−0.30 (−2.19)	−0.12 (−0.83)	1.00 (−)	0.06 (0.44)	0.43 (3.26)	0.31 (2.19)	−0.77 (−8.39)	−0.54 (−4.45)	−0.50 (−3.99)
TFes	−0.22 (−1.56)	−0.04 (−0.26)	−0.45 (−3.53)	−0.59 (−5.00)	−0.14 (−0.97)	0.51 (4.11)	−0.33 (−2.41)	−0.18 (−1.30)	−0.61 (−5.37)	−0.48 (−3.83)	0.67 (6.31)	0.31 (2.22)	0.06 (0.44)	1.00 (−)	0.69 (6.53)	−0.22 (−1.55)	−0.40 (−3.07)	0.08 (0.59)	0.25 (1.83)
TFepa	0.09 (0.60)	0.29 (2.08)	−0.20 (−1.39)	−0.62 (−5.42)	0.18 (1.28)	0.31 (2.22)	0.25 (1.82)	−0.50 (−3.99)	−0.16 (−1.12)	−0.30 (−2.18)	0.31 (2.23)	0.26 (1.89)	0.43 (3.26)	0.69 (6.53)	1.00 (−)	−0.04 (−0.27)	−0.71 (−7.08)	−0.38 (−2.82)	−0.12 (−0.82)
VAC	0.44 (3.36)	0.43 (3.25)	0.56 (4.60)	0.48 (3.68)	0.37 (2.72)	−0.51 (−4.00)	−0.08 (−0.55)	−0.11 (−0.77)	0.52 (4.17)	0.53 (4.21)	−0.41 (−3.09)	−0.17 (−1.20)	0.31 (2.19)	−0.22 (−1.55)	−0.04 (−0.27)	1.00 (−)	−0.36 (−2.63)	−0.05 (−0.31)	−0.08 (−0.56)
ICLU	−0.26 (−1.85)	−0.29 (−2.09)	−0.08 (−0.54)	0.24 (1.74)	−0.12 (−0.86)	0.03 (0.17)	−0.21 (−1.50)	0.11 (0.79)	−0.15 (−1.05)	−0.06 (−0.39)	0.02 (0.17)	−0.03 (−0.21)	−0.77 (−8.39)	−0.40 (−3.07)	−0.71 (−7.08)	−0.36 (−2.63)	1.00 (−)	0.45 (3.45)	0.36 (2.67)
GANH	−0.46 (−3.58)	−0.46 (−3.59)	−0.31 (−2.27)	0.31 (2.24)	−0.31 (−2.29)	0.23 (1.66)	−0.38 (−2.84)	0.08 (0.53)	−0.43 (−3.35)	−0.28 (−1.99)	0.22 (1.53)	−0.04 (−0.26)	−0.54 (−4.45)	0.08 (0.59)	−0.38 (−2.82)	−0.05 (−0.31)	0.45 (3.45)	1.00 (−)	0.70 (6.73)
GANHR	−0.18 (−1.29)	−0.07 (−0.51)	−0.14 (−0.99)	−0.07 (−0.46)	0.01 (0.05)	0.16 (1.13)	−0.41 (−3.14)	−0.01 (−0.09)	−0.30 (−2.15)	−0.13 (−0.94)	0.24 (1.72)	0.01 (0.06)	−0.50 (−3.99)	0.25 (1.83)	−0.12 (−0.82)	−0.08 (−0.56)	0.36 (2.67)	0.70 (6.73)	1.00 (−)

Table 42: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

1986.1-1998.2. Correlations Baxter-King																			
	GDP	PA	EMP	ASPU	TA	UT	HWes	HWepa	HTes	HTepa	LPHes	LPHepa	UCP	TFes	TFepa	VAC	ICLU	GANH	GANHR
GDP	1.00 (−)	0.47 (3.67)	0.92 (16.45)	0.20 (1.43)	0.38 (2.81)	−0.89 (−13.39)	−0.25 (−1.77)	−0.09 (−0.63)	0.88 (13.05)	0.88 (13.03)	−0.60 (−5.25)	−0.45 (−3.48)	0.53 (4.35)	−0.14 (−1.01)	0.16 (1.10)	0.42 (3.16)	−0.23 (−1.61)	−0.55 (−4.54)	−0.19 (−1.31)
PA	0.47 (3.67)	1.00 (−)	0.45 (3.52)	−0.05 (−0.31)	0.94 (18.77)	−0.25 (−1.81)	−0.10 (−0.70)	−0.37 (−2.74)	0.41 (3.11)	0.36 (2.68)	−0.29 (−2.12)	−0.17 (−1.19)	0.16 (1.15)	0.07 (0.50)	0.30 (2.16)	0.40 (2.99)	−0.16 (−1.11)	−0.41 (−3.08)	0.14 (1.01)
EMP	0.92 (16.45)	0.45 (3.52)	1.00 (−)	0.49 (3.90)	0.41 (3.11)	−0.97 (−27.94)	−0.32 (−2.35)	−0.03 (−0.17)	0.96 (23.25)	0.97 (30.05)	−0.80 (−9.15)	−0.69 (−6.59)	0.37 (2.77)	−0.44 (−3.38)	−0.16 (−1.16)	0.59 (5.01)	−0.04 (−0.25)	−0.31 (−2.23)	−0.15 (−1.04)
ASPU	0.20 (1.43)	−0.05 (−0.31)	0.49 (3.90)	1.00 (−)	−0.01 (−0.06)	−0.54 (−4.47)	−0.31 (−2.24)	0.20 (1.38)	0.46 (3.63)	0.53 (4.30)	−0.65 (−5.97)	−0.83 (−10.45)	−0.01 (−0.05)	−0.67 (−6.20)	−0.67 (−6.29)	0.55 (4.43)	0.26 (1.84)	0.45 (3.51)	−0.09 (−0.62)
TA	0.38 (2.81)	0.94 (18.77)	0.41 (3.11)	−0.01 (−0.06)	1.00 (−)	−0.22 (−1.55)	−0.04 (−0.28)	−0.34 (−2.49)	0.39 (2.94)	0.32 (2.38)	−0.35 (−2.61)	−0.22 (−1.58)	0.00 (0.01)	−0.04 (−0.30)	0.20 (1.42)	0.35 (2.53)	0.01 (0.06)	−0.18 (−1.24)	0.26 (1.88)
UT	−0.89 (−13.39)	−0.25 (−1.81)	−0.97 (−27.94)	−0.54 (−4.47)	−0.22 (−1.55)	1.00 (−)	0.33 (2.46)	−0.10 (−0.72)	−0.95 (−20.09)	−0.97 (−30.22)	0.79 (8.96)	0.69 (6.65)	−0.40 (−3.06)	0.51 (4.10)	0.27 (1.93)	−0.52 (−4.15)	0.00 (0.00)	0.26 (1.87)	0.25 (1.77)
HWes	−0.25 (−1.77)	−0.10 (−0.70)	−0.32 (−2.35)	−0.31 (−2.24)	−0.04 (−0.28)	0.33 (2.46)	1.00 (−)	−0.07 (−0.52)	−0.09 (−0.60)	−0.33 (−2.44)	−0.06 (−0.44)	0.35 (2.62)	0.18 (1.27)	−0.11 (−0.77)	0.24 (1.75)	−0.08 (−0.58)	−0.25 (−1.77)	0.01 (0.10)	−0.09 (−0.60)
HWepa	−0.09 (−0.63)	−0.37 (−2.74)	−0.03 (−0.17)	0.20 (1.38)	−0.34 (−2.49)	−0.10 (−0.72)	−0.07 (−0.52)	1.00 (−)	0.04 (0.29)	0.20 (1.41)	−0.10 (−0.68)	−0.31 (−2.26)	0.16 (1.14)	−0.27 (−1.98)	−0.51 (−4.14)	−0.06 (−0.39)	0.07 (0.50)	0.02 (0.17)	−0.30 (−2.19)
HTes	0.88 (13.05)	0.41 (3.11)	0.96 (23.25)	0.46 (3.63)	0.39 (2.94)	−0.95 (−20.09)	−0.09 (−0.60)	0.04 (0.29)	1.00 (−)	0.95 (20.84)	−0.89 (−13.85)	−0.67 (−6.17)	0.48 (3.75)	−0.55 (−4.58)	−0.17 (−1.16)	0.58 (4.88)	−0.10 (−0.70)	−0.31 (−2.26)	−0.21 (−1.52)
HTepa	0.88 (13.03)	0.36 (2.68)	0.97 (30.05)	0.53 (4.30)	0.32 (2.38)	−0.97 (−30.22)	−0.33 (−2.44)	0.20 (1.41)	0.95 (20.84)	1.00 (−)	−0.80 (−9.36)	−0.75 (−7.77)	0.40 (3.04)	−0.49 (−3.92)	−0.28 (−2.00)	0.57 (4.71)	−0.02 (−0.14)	−0.29 (−2.13)	−0.21 (−1.51)
LPHes	−0.60 (−5.25)	−0.29 (−2.12)	−0.80 (−9.15)	−0.65 (−5.97)	−0.35 (−2.61)	0.79 (8.96)	−0.06 (−0.44)	−0.10 (−0.68)	−0.89 (−13.85)	−0.80 (−9.36)	1.00 (−)	0.80 (9.27)	−0.34 (−2.52)	0.75 (7.74)	0.35 (2.59)	−0.65 (−5.86)	0.03 (0.24)	−0.01 (−0.10)	0.16 (1.11)
LPHepa	−0.45 (−3.48)	−0.17 (−1.19)	−0.69 (−6.59)	−0.83 (−10.45)	−0.22 (−1.58)	0.69 (6.65)	0.35 (2.62)	−0.31 (−2.26)	−0.67 (−6.17)	−0.75 (−7.77)	0.80 (9.27)	1.00 (−)	−0.14 (−0.96)	0.57 (4.79)	0.50 (4.04)	−0.66 (−5.89)	−0.07 (−0.50)	−0.21 (−1.50)	0.08 (0.57)
UCP	0.53 (4.35)	0.16 (1.15)	0.37 (2.77)	−0.01 (−0.05)	0.00 (0.01)	−0.40 (−3.06)	0.18 (1.27)	0.16 (1.14)	0.48 (3.75)	0.40 (3.04)	−0.34 (−2.52)	−0.14 (−0.96)	1.00 (−)	0.11 (0.74)	0.40 (3.02)	0.31 (2.20)	−0.82 (−9.85)	−0.65 (−5.95)	−0.70 (−6.86)
TFes	−0.14 (−1.01)	0.07 (0.50)	−0.44 (−3.38)	−0.67 (−6.20)	−0.04 (−0.30)	0.51 (4.10)	−0.11 (−0.77)	−0.27 (−1.98)	−0.55 (−4.58)	−0.49 (−3.92)	0.75 (7.74)	0.57 (4.79)	0.11 (0.74)	1.00 (−)	0.80 (9.39)	−0.34 (−2.47)	−0.47 (−3.72)	−0.36 (−2.64)	0.04 (0.29)
TFepa	0.16 (1.10)	0.30 (2.16)	−0.16 (−1.16)	−0.67 (−6.29)	0.20 (1.42)	0.27 (1.93)	0.24 (1.75)	−0.51 (−4.14)	−0.17 (−1.16)	−0.28 (−2.00)	0.35 (2.59)	0.50 (4.04)	0.40 (3.02)	0.80 (9.39)	1.00 (−)	−0.13 (−0.91)	−0.69 (−6.53)	−0.53 (−4.30)	−0.04 (−0.28)
VAC	0.42 (3.16)	0.40 (2.99)	0.59 (5.01)	0.55 (4.43)	0.35 (2.53)	−0.52 (−4.15)	−0.08 (−0.58)	−0.06 (−0.39)	0.58 (4.88)	0.57 (4.71)	−0.65 (−5.86)	−0.66 (−5.89)	0.31 (2.20)	−0.34 (−2.47)	−0.13 (−0.91)	1.00 (−)	−0.29 (−2.05)	−0.11 (−0.77)	−0.27 (−1.89)
ICLU	−0.23 (−1.61)	−0.16 (−1.11)	−0.04 (−0.25)	0.26 (1.84)	0.01 (0.06)	0.00 (0.00)	−0.25 (−1.77)	0.07 (0.50)	−0.10 (−0.70)	−0.02 (−0.14)	0.03 (0.24)	−0.07 (−0.50)	−0.82 (−9.85)	−0.47 (−3.72)	−0.69 (−6.53)	−0.29 (−2.05)	1.00 (−)	0.57 (4.82)	0.53 (4.36)
GANH	−0.55 (−4.54)	−0.41 (−3.08)	−0.31 (−2.23)	0.45 (3.51)	−0.18 (−1.24)	0.26 (1.87)	0.01 (0.10)	0.02 (0.17)	−0.31 (−2.26)	−0.29 (−2.13)	−0.01 (−0.10)	−0.21 (−1.50)	−0.65 (−5.95)	−0.36 (−2.64)	−0.53 (−4.30)	−0.11 (−0.77)	0.57 (4.82)	1.00 (−)	0.47 (3.66)
GANHR	−0.19 (−1.31)	0.14 (1.01)	−0.15 (−1.04)	−0.09 (−0.62)	0.26 (1.88)	0.25 (1.77)	−0.09 (−0.60)	−0.30 (−2.19)	−0.21 (−1.52)	−0.21 (−1.51)	0.16 (1.11)	0.08 (0.57)	−0.70 (−6.86)	0.04 (0.29)	−0.04 (−0.28)	−0.27 (−1.89)	0.53 (4.36)	0.47 (3.66)	1.00 (−)

Table 43: See appendix A for abbreviations meaning. Values in brackets are the t-statistic for testing the null of coefficient of correlation is zero, the null is not refuse if $-2 < t < 2$.

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